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PANTOLOGIA.

VOL. X.

Q — SOY.

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PANTOLOGIA.

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BY JOHN MASON GOOD, ESQ. F.R.S.

MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY, AND OF THE LINNEAN SOCIETY OF PHILADELPHIA;

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MR. NEWTON BOSWORTH,

OF CAMBRIDGE;

ASSISTED BY OTHER GENTLEMEN OF EMINENCE, IN DIFFERENT DEPARTMENTS OF LITERATURE.

VOL. X.

Q — SOY.

LONDON:

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1813.

PANTOLOGIA.

Q.

Q, A consonant, borrowed from the Latin or French, for which the Saxons generally used cp, *cw*; and the sixteenth letter of the alphabet.

The name of this letter is *cue*, from *queue*, French, tail; its form being that of an O with a tail.

The Q has this peculiar to it, that it is always followed by an U, and is, therefore, reckoned among the mutes.

The Q is formed from the Hebrew ק, koph; which most other languages have borrowed; though some of them have rejected it again, particularly the Greeks, who now only retain it as a numeral character, called κοππα επισημον.

In effect, there is that resemblance between the Q and C, in some languages, and the K in others, that many grammarians, in imitation of the Greeks, banish the Q as a superfluous letter. Papias even affirms, that all the Latin words now wrote with a Q, were written among the ancient Romans with a C; but we want better authorities for this. For, though that may hold in many cases, insomuch that some write indifferently *quur*, or *cur*; *cum*, or *quum*; *quotidie*, or *cotidie*, &c. yet does it not thence follow, that they ever wrote *cis*, *cæ*, *cid*, for *quis*, *quæ*, *quid*. What inscriptions authorize such a reading?

Far from this, the ancients sometimes substituted Q for C; and wrote *quojus*, *quoi*; for *cujus*, *cui*, &c.

Varro, however, and some other grammarians, as we are told by Censorinus, &c. would never use the Q. The truth is, its use or disuse seems to have been so little settled, and agreed on, that the poets used the Q or C indifferently, as best suited their measures; it being a rule, that the Q joined the two following vowels into one syllable; and that the C imported them to be divided.

Hence it is, that Lucretius uses *cuiret* for three syllables, in lieu of *quiret*; *acua*, for *aqua*; and that Plautus uses *relicuum*, for *reliquum*; as in *quod dedi, datum non vellum, relicuum non*; where the *cuum* must be two syllables, otherwise the trochaic verse will be lame of a foot

In the French, the sound of the Q and K are so near akin, that some of their nicest authors think the former might be spared. Ramus adds, that, till the establishment of royal professors in the university of Paris, under Francis I. they always used Q in the Latin the same as in the French; pronouncing *kis*, *kalis*, *kantus*, &c. for *quis*, *qualis*, *quantus*. See K.

Some very learned men make Q a double letter, as well as K and X. According to them, Q is evidently a C and U joined together.

It is not enough that the sound is the same, but they see the traces of the CU in the figure of the Q; the V being only laid obliquely, so as to come within the cavity of the C; as C ⊰.

To confirm this, they say the ancients wrote *qi*, *qæ*, *qid*. Though Jos. Scaliger, Littleton, &c. think this no proof of the point; for in Gruter's inscriptions we find not only the Q, but also the C, put for QU; as *Cintus*, *Quintus*; *sicis* for *siquis*, &c. Yet nobody ever imagined the C a double letter.

Q, among the ancients, was a numeral letter, signifying 500; as in the verse,

Q velut A cum D quingentos vult numerare.

A dash over it, as $\overline{Q}$, denoted it to signify five hundred thousand.

Q is also used as an abbreviature in several arts. Q. *pl.* in physicians bills, stand for

quantum placet, or *quantum vis*, as much as you please of a thing; *q. s.* for *quantum sufficit*, or as much as is necessary; *q. v.* for *quantum vis*, as much as you will.

Q. E. D. among mathematicians, signifies *quod erat demonstrandum*, which was to be demonstrated.

Q. E. F. *quod erat faciendum*, which was to be done.

Q. D. is also frequently used, among grammarians, &c. for *quasi dictum*, as if it were said, &c. or as who should say.

Q, in the proper names of the Romans, signifies Quintus, or Quintius. Upon the French coins this letter denotes that they were struck at Perpignan.

QUACHA. See BARB.

To QUACK. *v. a.* (*quacken*, Dutch.) 1. To cry like a duck (*King*). 2. To chatter boastingly; to brag loudly; to talk ostentatiously (*Hudibras*).

QUACK. *s.* (from the verb.) 1. A boasted pretender to arts which he does not understand (*Felton*). 2. A vain boasting pretender to physic; one who proclaims his own medical abilities in public places (*Addison*). 3. An artful tricking practitioner in physic (*Pope*).

QUA'CKERY. *s.* (from *quack.*) Mean or bad acts in physic: also pretensions to any art.

QUA'CKSALVER. *s.* (*quack* and *salve.*) One who brags of medicines or salves; a medicaster; a charlatan (*Burton*).

QUADI, a German nation near the country of the Marcomanni, on the borders of the Danube. They rendered themselves celebrated by their opposition to the Romans, by whom they were often defeated, though not totally subdued.

QUADRA and VANCOUVER ISLAND, an island on the N.W. coast of America, on the W. side of which is Nootka Sound. It was so named by captain Vancouver in compliment to senor Quadra, the Spanish commandant at Nootka. It is about 300 miles in length, and 80 in its greatest breadth.

QUADRAGE'SIMAL. *a.* (*quadragesimal*, French; *quadragesima*, Latin.) Lenten; belonging to lent; used in lent (*Sanderson*).

QUA'DRANGLE. *s.* (*quadratus* and *angulus*, Lat.) A square; a surface with four right angles (*Howel*).

QUADRA'NGULAR. *a.* (from *quadrangle.*) Square; having four right angles (*Woodward*).

QUADRANT, in geometry, is either the quarter or fourth part of a circle, or the fourth part of its circumference; the arch of which, therefore, contains 90 degrees.

QUADRANT also denotes a mathematical instrument, of great use in astronomy and navigation, for taking the altitudes of the sun and stars, as also taking angles in surveying, heights and distances, &c.

This instrument is variously contrived, and furnished with different apparatus, according to the various uses it is intended for; but they have all this in common, that they consist of the quarter of a circle, whose limb or arch is divided into 90°, &c. Some have a plummet suspended from the centre, and are furnished either with plain sights, or a telescope, to look through.

The principal and most useful quadrants, are the common surveying quadrant, the astronomical quadrant, Adams's quadrant, Cole's quadrant, Collins's or Sutton's quadrant, Davis's quadrant, Gunter's quadrant, Hadley's quadrant, the horodictical quadrant, and the sinical quadrant, &c. Of these in their order. See also MURAL QUADRANT.

1. *The Common, or Surveying Quadrant.*—This instrument ABC, fig. 1, pl. 147, is made of brass, or wood, &c.; the limb or arch of which BC is divided into 90°, and each of these farther divided into as many equal parts as the space will allow, either diagonally or otherwise. On one of the radii AC, are fitted two moveable sights; and to the centre is sometimes also annexed a label, or moveable index AD, bearing two other sights; but instead of these last sights, there is sometimes fitted a telescope. Also from the centre hangs a thread with a plummet; and on the under side or face of the instrument is fitted a ball and socket, by means of which it may be put into any position. The general use of it is for taking angles in a vertical plane, comprehended under right lines going from the centre of the instrument, one of which is horizontal, and the other is directed to some visible point. But besides the parts above described, there is often added on the face, near the centre, a kind of compartment EF, called a quadrat, or geometrical square, which is a kind of separate instrument, and is particularly useful in altimetry and longimetry, or heights and distances.

This quadrant may be used in different situations; in each of them the plane of the instrument must be set parallel to that of the eye and the objects whose angular distance is to be taken. Thus, for observing heights or depths, its plane must be disposed vertically, or perpendicular to the horizon; but to take horizontal angles or distances, its plane must be disposed parallel to the horizon.

Again, heights and distances may be taken two ways, viz. by means of the fixed sights and plummet, or by the label; as also, either by the degrees on the limb, or by the quadrat. Thus, fig. 2, pl. 24, shews the manner of taking an angle of elevation with this quadrant; the eye is applied at C, and the instrument turned vertically about the centre A, till the object R be seen through the sights on the radius AC; then the angle of elevation RAH, made with the horizontal line KAH, is equal to the angle BAD, made by the plumb line and the other radius of the quadrant, and the quantity of it is shewn by the degrees in the arch BD cut off by the plumb line AD.

2. *The Astronomical Quadrant*, is a large one, usually made of brass or iron bars; having its limb EF (fig. 3, pl. 147) nicely divided, either diagonally or otherwise, into degrees, minutes, and seconds, if room will permit, and furnished either with two pair of plain sights or two telescopes, one on the side of the quadrant at AB, and the other CD moveable about the centre by means of the screw G. The dented wheels I and H serve to direct the instrument to any object or phenomenon.

The application of this useful instrument, in taking observations of the sun, planets, and fixed stars, is obvious; for being turned horizontally upon its axis, by means of the telescope AB, till the object is seen through the moveable telescope, then the degrees, &c. cut by the index, give the altitude, &c. required.

The Common.

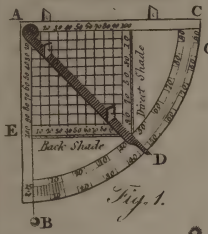


Fig. 1.

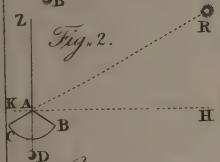


Fig. 2.

Astronomical.

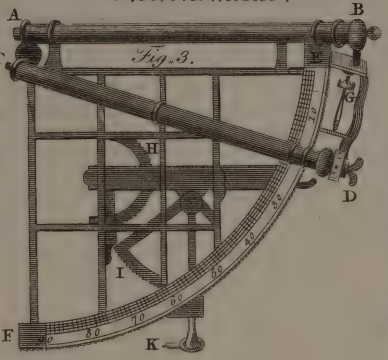


Fig. 3.

Gunter's.

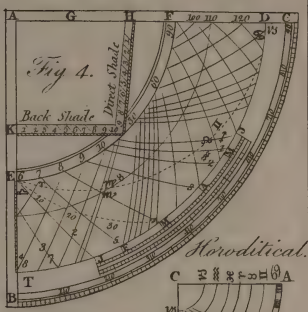


Fig. 4.

Horoditical.

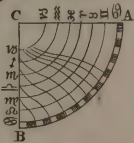


Fig. 5.

Gunner's.



Fig. 6.

Hadley's

Fig. 7.

Sutton's. Fig. 8.

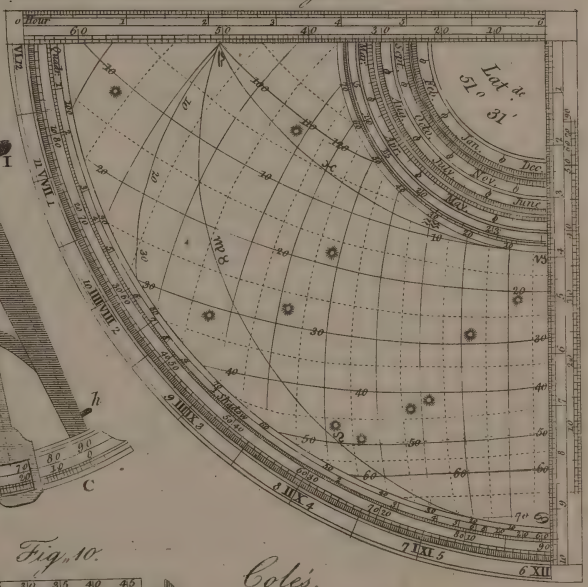
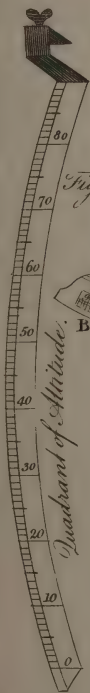
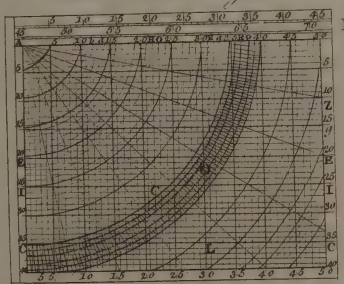


Fig. 9.



Sinical. Fig. 10.



Coles.

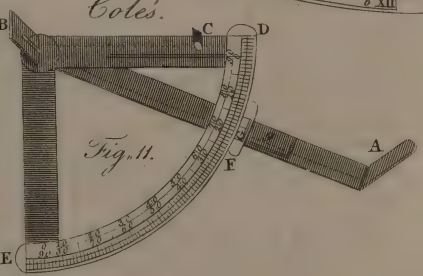


Fig. 11.

Medlow Sc. Russell Ct.

London, Published by Sherwood & Cº Paternoster Row Aug. 1st 1812.

3. *Cole's Quadrant*, is a very useful instrument, invented by Mr. Benjamin Cole. It consists of six parts, viz. the staff AB (fig. 11, pl. 147); the quadrantal arch DE; three vanes A, B, C; and the vernier FG. The staff is a bar of wood about two feet long, an inch and a quarter broad, and of a sufficient thickness to prevent it from bending or warping. The quadrantal arch is also of wood; and is divided into degrees and third parts of degrees, to a radius of about nine inches; and to its extremities are fitted two radii, which meet in the centre of the quadrant by a pin, about which it easily moves. The sight-vane A is a thin piece of brass, near two inches in height, and one broad, set perpendicularly on the end of the staff A, by means of two screws passing through its foot. In the middle of this vane is drilled a small hole, through which the coincidence or meeting of the horizon and solar spot is to be viewed. The horizon-vane B is about an inch broad, and two inches and a half high, having a slit cut through it of near an inch long, and a quarter of an inch broad; this vane is fixed in the centre-pin of the instrument, in a perpendicular position, by means of two screws passing through its foot, by which its position with respect to the sight-vane is always the same, their angle of inclination being equal to 45 degrees. The shade-vane C is composed of two brass plates. The one, which serves as an arm, is about four inches and a half long, and three-fourths of an inch broad, being pinned at one end to the upper limb of the quadrant by a screw, about which it has a small motion; the other end lies in the arch, and the lower edge of the arm is directed to the middle of the centre-pin; the other plate, which is properly the vane, is about two inches long, being fixed perpendicularly to the other plate, at about half an inch distance from that end next the arch; this vane may be used either by its shade, or by the solar spot cast by a convex lens placed in it. And because the wood work is often subject to warp or twist, therefore this vane may be rectified by means of a screw, so that the warping of the instrument may occasion no error in the observation, which is performed in the following manner:—Set the line G on the vernier against a degree on the upper limb of the quadrant, and turn the screw on the backside of the limb forward or backward, till the hole in the sight-vane, the centre of the glass, and the sunk spot in the horizon-vane, lie in a right line.

To find the sun's altitude by this instrument.—Turn your back to the sun, holding the staff of the instrument with the right hand, so that it be in a vertical plane passing through the sun; apply one eye to the sight-vane, looking through that and the horizon-vane till the horizon be seen; with the left hand slide the quadrantal arch upwards, till the solar spot or shade, cast by the shade-vane, fall directly upon the spot or slit in the horizon-vane; then will that part of the quadrantal arch which is raised above G or S (according as the observation respects either the solar spot or shade) shew the altitude of the sun at that time. But for the meridian altitude, the observation must be continued, and as the sun approaches the meridian, the sea will appear through the horizon-vane, which completes the observation; and the degrees and minutes, counted as before, will give the sun's meridian altitude: or the degrees counted from the lower limb upwards will give the zenith distance.

4. *Adams's Quadrant*, differs only from Cole's quadrant, just described, in having an horizontal vane, with the upper part of the limb lengthened; so that the glass, which casts the solar spot on the horizon-vane, is at the same distance from the horizon-vane as the sight-vane at the end of the index.

5. *Collins's* or *Sutton's Quadrant* (fig. 8, pl. 147.), is a stereographic projection of one quarter of the sphere between the tropics, upon the plane of the ecliptic, the eye being in its north pole; and fitted to the latitude of London. The lines running from right to left, are parallels of altitude; and those crossing them are azimuths. The smaller of the two circles, bounding the projection, is one quarter of the tropic of Capricorn; and the greater is a quarter of the tropic of Cancer. The two ecliptics are drawn from a point on the left edge of the quadrant, with the characters of the signs upon them; and the two horizons are drawn from the same point. The limb is divided both into degrees and time; and by having the sun's altitude, the hour of the day may here be found to a minute. The quadrantal arches next the centre contain the calendar of months; and under them, in another arch, is the sun's declination. On the projection are placed several of the most remarkable fixed stars between the tropics; and the next below the projection is the quadrant and line of shadows.

To find the time of the sun's rising or setting, his amplitude, his azimuth, hour of the day, &c. by this quadrant.—Lay the thread on the day and the month, and bring the bead to the proper ecliptic, either of summer or winter, according to the season, which is called rectifying; then by moving the thread bring the bead to the horizon, in which case the thread will cut the limb in the point of the time of the sun's rising or setting before or after six: and at the same time the bead will cut the horizon in the degrees of the sun's amplitude. Again, observing the sun's altitude with the quadrant, and supposing it found to be 45° on the 5th of May, lay the thread over the 5th of May; then bring the bead to the summer ecliptic, and carry it to the parallel of altitude 45°; in which case the thread will cut the limb at 55° 15′, and the hour will be seen among the hour-lines to be either 41m. past nine in the morning, or 19m. past two in the afternoon.—Lastly, the bead shews among the azimuths the sun's distance from the south 50° 41′.

But note, that if the sun's altitude be less than what it is at six o'clock, the operation must be performed among those parallels above the upper horizon; the bead being rectified to the winter ecliptic.

6. *Davis's Quadrant*, the same as the BACKSTAFF; which see.

7. *Gunner's Quadrant* (fig. 6, pl. 147.), sometimes called the gunner's square, is used for elevating and pointing cannon, mortars, &c. and consists of two branches either of wood or brass, between which is a quadrantal arch divided into 90°, and furnished with a thread and plummet.

The use of this instrument is very easy; for if the longer branch, or bar, be placed in the mouth of the piece, and it be elevated till the plummet cut the degree necessary to hit a proposed object, the thing is done.

Sometimes on the sides of the longer bar are noted the division of diameters and weights of iron balls, as also the bores of pieces.

8. *Gunter's Quadrant*, so called from its inventor Edmund Gunter (fig. 4, pl. 147.), beside the apparatus of other quadrants, has a stereographic pro-

jection of the sphere on the plane of the equinoctial; and also a calendar of the months, next to the divisions of the limb; by which, beside the common purposes of other quadrants, several useful questions in astronomy, &c. are easily resolved.

9. *Hadley's Quadrant* (fig. 7, pl. 147.), so called from its inventor John Hadley, Esq. is now universally used as the best of any for nautical and other observations.

It seems the first idea of this excellent instrument was suggested by Dr. Hooke; for Dr. Sprat, in his History of the Royal Society, p. 246, mentions the invention of a new instrument for taking angles by reflection, by which means the eye at once sees the two objects both as touching the same point, though distant almost to a semicircle; which is of great use for making exact observations at sea. This instrument is described and illustrated by a figure in Hooke's Posthumous works, p. 503. But as it admitted of only one reflection, it would not answer the purpose. The matter, however, was at last effected by sir Isaac Newton, who communicated to Dr. Halley a paper of his own writing, containing the description of an instrument with two reflections, which, soon after the doctor's death, was found among his papers by Mr. Jones, by whom it was communicated to the Royal Society, and it was published in the Philos. Trans. for the year 1742. How it happened that Dr. Halley never mentioned this in his lifetime, is hard to say; but it is very extraordinary; more especially as Mr. Hadley had described, in the Trans. for 1731, his instrument, which is constructed on the same principles. Mr. Hadley, who was well acquainted with sir Isaac Newton, might have heard him say, that Dr. Hooke's proposal could be effected by means of a double reflection; and perhaps in consequence of this hint, he might apply himself, without any previous knowledge of what Newton had actually done, to the construction of his instrument. Mr. Godfrey too, of Pennsylvania, had recourse to a similar expedient; for which reason some gentlemen of that colony have ascribed the invention of this excellent instrument to him. The truth may probably be, that each of these gentlemen discovered the method independent of one another. See also Trans. of the American Society, vol. i. p. 21 Appendix.

This instrument consists of the following particulars:—1. An octant, or the eighth part of a circle, ABC. 2. An index D. 3. The speculum F. 4. Two horizontal glasses, F, G. 5. Two screens, K and K. 6. Two sight-vanes, H and I.

The octant consists of two radii AB, AC, strengthened by the braces L, M, and the arch BC; which, though containing only 45°, is nevertheless divided into 90 primary divisions, each of which stands for degrees, and are numbered 0, 10, 20, 30, &c. to 90; beginning at each end of the arch for the convenience of numbering both ways, either for altitudes or zenith distances: also each degree is subdivided into minutes, by means of a vernier. But the number of these divisions varies with the size of the instrument.

The index D is a flat bar, moveable about the centre of the instrument; and that part of it which slides over the graduated arch BC, is open in the middle, with Vernier's scale on the lower part of it; and underneath is a screw, serving to fasten the index against any division.

The speculum E is a piece of flat glass, quicksilvered on one side, set in a brass box, and placed perpendicular to the plane of the instrument, the middle part of the former coinciding with the centre of the latter: and because the speculum is fixed to the index, the position of it will be altered by the moving of the index along the arch. The rays of an observed object are received on the speculum, and from thence reflected on one of the horizon glasses F or G; which are two small pieces of looking glass placed on one of the limbs, their faces being turned obliquely to the speculum, from which they receive the reflected rays of objects. This glass F has only its lower part silvered, and set in brass-work; the upper part being left transparent to view the horizon. The glass G has in its middle a transparent slit, through which the horizon is to be seen. And because the warping of the materials, and other accidents, may distend them from their true situation, there are three screws passing through their feet, by which they may be easily replaced.

The screens are two pieces of coloured glass, set in two square brass frames K and K, which serve as screens to take off the glare of the sun's rays, which would otherwise be too strong for the eye: the one is tinged much deeper than the other; and as they both move on the same centre, they may be both or either of them used: in the situation they appear in the figure, they serve for the horizon-glass F; but when they are wanted for the horizon-glass G, they must be taken from their present situation, and placed on the quadrant above G.

The sight-vanes are two pins H and I, standing perpendicularly to the plane of the instrument: that at H has one hole in it, opposite to the transparent slit in the horizon-glass G; the other, at I, has two holes in it, the one opposite to the middle of the transparent part of the horizon-glass F, and the other rather lower than the quicksilvered part: this vane has a piece of brass on the back of it, which moves round a centre, and serves to cover either of the holes.

Of the observations.—There are two sorts of observations to be made with this instrument: the one is when the back of the observer is turned towards the object, and therefore called the back observation; the other when the face of the observer is turned towards the object, which is called the fore observation.

To rectify the instrument for the fore observation:—Slacken the screw in the middle of the handle behind the glass F; bring the index close to the button *h*; hold the instrument in a vertical position, with the arch downwards; look through the right hand hole in the vane I, and through the transparent part of the glass F, for the horizon; and if it lie in the same right line with the image of the horizon seen on the silvered part, the glass F is rightly adjusted; but if the two horizontal lines disagree, turn the screw which is at the end of the handle backward or forward, till those lines coincide; then fasten the middle screw of the handle, and the glass is rightly adjusted.

To take the sun's altitude by the fore observation.—Having fixed the screens above the horizon-glass F, and suited them proportionally to the strength of the sun's rays, turn your face towards the sun, holding the instrument with your right hand, by the braces L and M, in a vertical position, with the arch downward; put your eye close to the right hand hole in the vane I, and view the horizon through the transparent part of the horizon-glass F, at the same time moving the index D with the left hand, till the reflex solar spot coincides with

the line of the horizon; then the degrees counted from C, or that end next your body, will give the sun's altitude at that time, observing to add or subtract 16 minutes according as the upper or lower edge of the sun's reflex image is made use of.

But to get the sun's meridian altitude, which is the thing wanted for finding the latitude; the observations must be continued; and as the sun approaches the meridian the index D must be continually moved towards B, to maintain the coincidence between the reflex solar spot and the horizon; and consequently as long as this motion can maintain the same coincidence, the observation must be continued, till the sun has reached the meridian, and begins to descend, when the coincidence will require a retrograde motion of the index, or towards C; and then the observation is finished, and the degrees counted as before will give the sun's meridian altitude, or those from B will give the zenith distance; observing to add the semi-diameter, or 16′, when his lower edge is brought to the horizon; or to subtract 16′, when the horizon and upper edge coincide.

To take the altitude of a star by the fore observation.—Through the vane H, and the transparent slit in the glass G, look directly to the star; and at the same time move the index, till the image of the horizon behind you, being reflected by the great speculum, be seen in the silvered part of G, and meet the star; then will the index shew the degrees of the star's altitude.

To rectify the instrument for the back observation.—Slacken the screw in the middle of the handle, behind the glass G; turn the button *h* on one side, and bring the index as many degrees before o as is equal to double the dip of the horizon at your height above the water; hold the instrument vertical, with the arch downward; look through the hole of the vane H; and if the horizon, seen through the transparent slit in the glass G, coincide with the image of the horizon seen in the silvered part of the same glass, then the glass G is in its proper position; but if not, set it by the handle, and fasten the screw as before.

To take the sun's altitude by the back observation.—Put the stem of the screens K and K into the hole *r*, and in proportion to the strength or faintness of the sun's rays, let either one or both or neither of the frames of those glasses be turned close to the face of the limb; hold the instrument in a vertical position, with the arch downward, by the braces L and M, with the left hand; turn your back to the sun, and put one eye close to the hole in the vane H, observing the horizon through the transparent slit in the horizon-glass G; with the right hand move the index D, till the reflected image of the sun be seen in the silvered part of the glass G, and in a right line with the horizon; swing your body to and fro, and if the observation be well made, the sun's image will be observed to brush the horizon, and the degrees reckoned from C, or that part of the arch farthest from your body, will give the sun's altitude at the time of observation: observing to add 16′ or the sun's semi-diameter if the sun's upper edge be used, and subtract the same for the lower edge.

The direction just given, for taking altitudes at sea, would be sufficient, but for two corrections that are necessary to be made before the altitude can be accurately determined, viz. one on account of the observer's eye being raised above the level of the sea, and the other on account of the refraction of the atmosphere, especially in small altitudes. See DIP and REFRACTION.

10. *Horodictical Quadrant*, a pretty commodious instrument, and is so called from its use in telling the hour of the day. Its construction is as follows:—From the centre of the quadrant C (fig. 5, pl. 147.), whose limb AB is divided into 90°, describe seven concentric circles at any intervals; and to these add the signs of the zodiac, in the order represented in the figure. Then, applying a ruler to the centre C and the limb A B, mark upon the several parallels the degrees corresponding to the altitude of the sun, when in them, for the given hours; connect the points belonging to the same hour with a curve line, to which add the number of the hour. To the radius CA fit a couple of sights, and to the centre of the quadrant C tie a thread with a plummet, and upon the thread a bead to slide.

Now, if the bead be brought to the parallel in which the sun is, and the quadrant be directed to the sun, till a visual ray pass through the sights, the bead will shew the hour. For the plummet, in this situation, cuts all the parallels in the degrees corresponding to the sun's altitude. And since the bead is in the parallel which the sun describes, and because hour-lines pass through the degrees of altitude to which the sun is elevated every hour, therefore the bead must shew the present hour.

11. *Sinical Quadrant*, is one of some use in navigation. It consists of several concentric quadrantal arches, divided into eight equal parts by means of radii, with parallel right lines crossing each other at right angles. Now any one of the arches, as BC (fig. 10, pl. 147.), may represent a quadrant of any great circle of the sphere, but is chiefly used for the horizon or meridian. If then BC be taken for a quadrant of the horizon, either of the sides, as AB, may represent the meridian; and the other side AC, will represent a parallel, or line of east and west; all the other lines, parallel to AB, will be also meridians; and all those parallel to AC, east and west lines, or parallels. Again, the eight spaces into which the arches are divided by the radii, represent the eight points of the compass in a quarter of the horizon; each containing 11° 15′. The arch BC is likewise divided into 90°, and each degree subdivided into 12′, diagonalwise. To the centre is fixed a thread, which, being laid over any degree of the quadrant, serves to divide the horizon.

If the sinical quadrant be taken for a fourth part of the meridian, one side of it AB may be taken for the common radius of the meridian and equator; and then the other AC will be half the axis of the world. The degrees of the circumference BC will represent degrees of latitude; and the parallels to the side AB, assumed from every point of latitude to the axis AC, will be radii of the parallels of latitude, as likewise the cosine of those latitudes.

Hence, suppose it be required to find the degrees of longitude contained in 83 of the lesser leagues in the parallel of 48°: lay the thread over 48° of latitude on the circumference, and count thence the 83 leagues on AB, beginning at A; this will terminate in H, allowing every small interval four leagues. Then tracing out the parallel HE, from the point H to the thread; the part AE of the thread shews that 125 greater or equinoctial leagues make 6° 15′; and therefore that the 83 lesser leagues AH, which make the difference of

longitude of the course, and are equal to the radius of the parallel HE, make 6° 15′ of the said parallel.

When the ship sails upon an oblique course, such course, beside the north and south greater leagues, gives lesser leagues easterly and westerly, to be reduced to degrees of longitude of the equator. But these leagues being made neither on the parallel of departure, nor on that of arrival, but in all the intermediate ones, there must be found a mean proportional parallel between them. To find this, there is on the instrument a scale of cross latitudes. Suppose then it were required to find a mean parallel between the parallels of 40° and 60°; take with the compasses the middle between the 40th and 60th degree on the scale: this middle point will terminate against the 51st degree, which is the mean parallel sought.

The chief use of the sinical quadrant is to form upon it triangles similar to those made by a ship's way with the meridians and parallels; the sides of which triangles are measured by the equal intervals between the concentric quadrants and the lines N and S, E and W: and every fifth line and arch is made deeper than the rest. Now, suppose a ship has sailed 150 leagues north-east by north, or making an angle of 33° 45′ with the north part of the meridian: here are given the course and distance sailed, by which a triangle may be formed on the instrument similar to that made by the ship's course; and hence the unknown parts of the triangle may be found. Thus, supposing the centre A to represent the place of departure; count, by means of the concentric circles along the point the ship sailed on, viz. AD, 150 leagues: then in the triangle AED, similar to that of the ship's course, find AE=difference of latitude, and DE =difference of longitude, which must be reduced according to the parallel of latitude come to.

Sutton's Quadrant. See *Collins's Quadrant.*

12. *Quadrant of Altitude* (fig. 9, pl. 147.), is an appendix to the artificial globe, consisting of a thin slip of brass, the length of a quarter part of one of the great circles of the globe, and graduated. At the end, where the division terminates, is a nut riveted on, and furnished with a screw, by means of which the instrument is fitted on the meridian, and moveable round upon the rivet to all points of the horizon, as represented in the figure referred to.—Its use is to serve as a scale in measuring altitudes, amplitudes, azimuths, &c.

QUADRA'NTAL. *a.* (from *quadrant.*) Included in the fourth part of a circle (*Derham*).

QUADRANTAL TRIANGLE, is a spherical triangle, which has one side equal to a quadrant or quarter part of a circle.

QUADRAT, called also geometrical square, and line of shadows: it is often an additional member on the face of Gunter's and Sutton's quadrants; and is chiefly useful in taking heights or depths.

QUADRAT, in astrology, is the same as quartile, being an aspect of the heavenly bodies when they are distant from each other a quadrant, or 90°, or 3 signs, and is thus marked □.

QUA'DRATE. *a.* (*quadratus*, Latin.) 1. Square; having four equal and parallel sides. 2. Divisible into four equal parts (*Hakewill*). 3. (*quadrans*, Lat.) Suited; applicable (*Harvey*).

QUA'DRATE. *s.* A square; a surface with four equal and parallel sides (*Spenser*).

To QUA'DRATE. *v. n.* (*quadro*, Latin; *quadrer*, French.) To suit; to be accommodated (*Addison*).

QUADRATIC EQUATIONS, in algebra, are those in which the unknown quantity is of two dimensions, or raised to the second power. See EQUATION, and ALGEBRA.

Quadratic equations are either simple, or affected, that is, compound.

A simple quadratic equation, is that which contains the second power only of the unknown quantity, without any other power of it: as $x^2=25$, or $y^2=ab$. And in this case, the value of the unknown quantity is found by barely extracting the square root on both sides of the equation: so in the equations above, it will be $x=\pm 5$, and $y=\pm\sqrt{ab}$; where the sign of the root of the known quantity is to be taken either plus or minus, for either of these may be considered as the sign of the value of the root x, since either of these, when squared, make the same square, $+5^2=25$, and $-5^2=25$ also; and hence the root of every quadratic or square has two values.

Compound or *affected quadratics*, are those which contain both the 1st and 2d powers of the unknown quantity; as $x^2+ax=b$, or $x^{2n}-ax^n=\pm b$, where n may be of any value, and then x^n is to be considered as the root or unknown quantity.

Affected quadratics are usually distinguished into three forms, according to the signs of the terms of the equation:

Thus, 1st form, $x^2+ax=b$,
2d form, $x^2-ax=b$,
3d form, $x^2-ax=-b$.

But the method of extracting the root, or finding the value of the unknown quantity x, is the same in all of them. And that method is usually performed by what is called completing the square, which is done by taking half the coefficient of the 2d term or single power of the unknown quantity, then squaring it, and adding that square to both sides of the equation, which makes the unknown side a complete square. Thus, in the equation $x^2+ax=b$, the coefficient of the 2d term being a, its half is $\frac{1}{2}a$, the square of which is $\frac{1}{4}a^2$, and this added to both sides of the equation, it becomes $x^2+ax+\frac{1}{4}a^2=\frac{1}{4}a^2+b$, the former side of which is now a complete square. The square being thus completed, its root is next to be extracted; in order to which, it is to be observed, that the root on the unknown side consists of two terms, the one of which is always x the square root of the first term of the equation, and the other part is $\frac{1}{2}a$ or half the coefficient of the 2d term: thus then the root of $x^2+ax+\frac{1}{4}a^2$ the first side of the completed equation being $x+\frac{1}{2}a$, and the root of the other side $\frac{1}{4}a^2+b$ being $\pm\sqrt{\frac{1}{4}a^2+b}$, it follows that $x+\frac{1}{2}a=\pm\sqrt{\frac{1}{4}a^2+b}$, and hence, by transposing $\frac{1}{2}a$, it is $x=-\frac{1}{2}a\pm\sqrt{\frac{1}{4}a^2+b}$, the two values of x, or roots of the given equation $x^2+a=b$. And thus is found the root, or value of x, in the three forms of equations above mentioned: thus,

1st form, $x=-\frac{1}{2}a\pm\sqrt{\frac{1}{4}a^2+b}$,
2d form, $x=+\frac{1}{2}a\pm\sqrt{\frac{1}{4}a^2+b}$,
3d form, $x=+\frac{1}{2}a\pm\sqrt{\frac{1}{4}a^2-b}$,

where it is observable that because of the double sign $\pm$ every form of quadratics has two roots. In the first and second forms those roots are one

positive and the other negative, the positive root being the less of the two in the first form, but the greater in the second form; while in the third form the roots are both positive.

It may not be amiss to shew in this place, that if there exist a quantity which substituted for x satisfies the equation of the second degree $x^2 + px = q$, and is, consequently, the value of x, that unknown will also have another value.

Substituting a for x, there would result $a^2 + pa = q$; and since, by hypothesis, a is the value of x, q will necessarily be equal to the quantity $a^2 + pa$: we may therefore write this quantity instead of q in the proposed equation, which will therefore become

$$x^2 + px = a^2 + pa.$$

Transposing all the terms of the second member into the first, it will become

$$x^2 + px - a^2 - pa = 0,$$

which may evidently be written thus,

$$x^2 - a^2 + p(x - a) = 0;$$

and because $x^2 - a^2 = (x + a)(x - a)$, we see at once that the first member is divisible by $x - a$, so as to give an exact quotient $x + a + p$; we shall therefore have

$x^2 + px - q = x^2 - a^2 + p(x - a) = (x - a)(x + a + p)$. Now it is manifest that a product is equal to zero, when either of its factors becomes nothing; we must therefore have

$(x - a)(x + a + p) = 0$, not only when $x = a$, which gives $x - a = 0$, but also when $x + a + p = 0$, whence results $x = -a - p$.

It is therefore proved that if a is one of the values of x, $-a - p$ will necessarily be the other. This result accords with the two values comprised in the formula

$$x = -\tfrac{1}{2}p \pm \sqrt{q + \tfrac{1}{4}p^2};$$

for, by taking one of the roots for a,

$-\frac{1}{2}p + \sqrt{q + \frac{1}{4}p^2}$, for example, we shall find for the other

$$-a - p = \tfrac{1}{2}p - \sqrt{q + \tfrac{1}{4}p^2} - p = -\tfrac{1}{2}p - \sqrt{q + \tfrac{1}{4}p^2},$$

which is obviously the other root comprised in the general form.

We may also see that the equation $x^2 + px = q$, or $x^2 + px - q = 0$, cannot have more than two roots. For, supposing that it could have a third represented by b, we might prove, as above, that $x - b$ must be of the number of the factors of $x^2 + px - q$, or of $(x - a)(x + a + p)$; and we may easily be assured that the terms $x - a$ and $x + a + p$, being prime to each other, or having no common factor, their product cannot have any other than they; thus $-b$ cannot be other than $-a$, or $+a + p$. See, farther, the articles EQUATIONS and ALGEBRA.

QUADRATRIX, or QUADRATIX, in geometry, is a mechanical line, by means of which, right lines are found equal to the circumference of circles, or other curves, and of the parts of the same. Or, more accurately, the quadratrix of a curve, is a transcendental curve described on the same axis, the ordinates of which being given, the quadrature of the correspondent parts in the other curve is likewise given. See CURVE.—Thus, for example, the curve AND (fig. 1, pl. 148), may be called the quadratrix of the parabola AMC, when the area APMA bears some such relation as the following to the absciss AP or ordinate PN, viz.

when APM $=$ PN^2,
or APM $=$ AP $\times$ PN,
or APM $= a \times$ PN,

where a is some given constant quantity.

The most distinguished of these quadratrices are, those of Dinostrates and of Tschirnhausen for the circle, and that of Mr. Perks for the hyperbola.

QUADRATRIX of Dinostrates, is a curve AMD, fig. 2, by which the quadrature of the circle is effected, though not geometrically, but only mechanically. It is so called from its inventor Dinostrates; and the genesis or description of it is as follows:—Divide the quadrantal arc ANB into any number of equal parts, in the points N, n, n, &c.; and also the radius AC into the same number of parts at the points P, p, p, &c. To the points of N, n, n, &c. draw the radii CN, Cn, &c.; and from the points P, p, &c. the parallels to CB, as PM, Pm, &c.: then through all the points of intersection draw the curve AMmD, and it will be the quadratrix of Dinostrates.

Or the same curve may be conceived as described by a continued motion, thus:—Conceive a radius CN to revolve with a uniform motion about the centre C, from the position AC to the position BC; and at the same time a ruler PM always moving uniformly parallel towards CB; the two uniform motions being so regulated that the radius and the ruler shall arrive at the position BC at the same time. For thus the continual intersection M, m, &c. of the revolving radius, and moving ruler, will describe the quadratrix AMm, &c. Hence,

1. *For the equation of the quadratrix.*—Since, from the relation of the uniform motions, it is always, AB : AN : : AC : AP; therefore if AB $= a$, AC $= r$, AP $= x$, and AN $= z$, it will be $a : z : : r : x$, or $ax = rz$, which is the equation of the curve.

Or, if s denote the sine NE of the arc AN, and $y =$ PM the ordinate of the curve AM, its abscissa AP being x; then, by similar triangles, CE : CP : : EN : PM, that is, $\sqrt{r^2 - s^2} : r - x : : s : y$,

and hence $y\sqrt{r^2 - s^2} = r - x \cdot s$, the equation of the curve. And when the relation between AB and AN is given, in terms of that between AC and AP, hence will be expressed the relation between the sine EN and the radius CB, or s will be expressed in terms of r and x; and consequently the equation of the curve will be expressed in terms of r, x, and y only.

2. The base of the quadratrix CD is a third proportional to the quadrant AB and the radius AC or CB; i. e. CD : CB : : CB : AB. Hence the rectification and quadrature of the circle.

3. A quadrantal arc DF described with the centre C and radius CD, will be equal in length to the radius CA or CB.

4. CDF being a quadrant inscribed in the quadratrix AMB, fig. 3, if the base CD be $= 1$; and the circular arc DG $= x$; then in the area CFMD

$$= x - \frac{1}{9}x^3 - \frac{1}{225}x^5 - \frac{2}{6615}x^7, \text{ &c.}$$

QUADRATURE, in geometry, denotes the squaring, or reducing a figure to a square. Thus, the finding of a square, which shall contain just as much surface or area as a circle, an ellipsis, a triangle, &c. is the quadrature of a circle, ellipsis, &c. The quadrature, especially among the ancient mathematicians, was a great postulatum. The quadrature of rectilineal figures is easily found, for it is merely the finding their areas or surfaces, i. e. their squares; for the squares of equal areas are easily found by only extracting the roots of the areas thus found. See GEOMETRY. The quadrature of curvilinear spaces is of more difficult

investigation; and in this respect extremely little was done by the ancients, except the quadrature of the parabola by Archimedes. In 1657, sir Paul Neil, lord Brouncker, and sir Christopher Wren, geometrically demonstrated the equality of some curvilinear spaces to rectilinear spaces; and soon after the like was proved both at home and abroad of other curves, and it was afterwards brought under an analytical calculus; the first specimen of which was given to the public in 1688 by Mercator, in a demonstration of lord Brouncker's quadrature of the hyperbola, by Dr. Wallis's reduction of a fraction into an infinite series of division. Sir Isaac Newton, however, had before discovered a method of attaining the quantity of all quadruple curves analytically by his fluxions before 1668. It is disputed between sir Christopher Wren and Mr. Huygens which of them first discovered the quadrature of any determinate cycloidal space. Mr. Leibnitz afterwards found that of another space; and in 1669 Bernoulli discovered the quadrature of an infinity of cycloidal spaces, both segments and sectors, &c.

The quadrature of curvilinear spaces, as the circle, ellipsis, parabola, &c. makes part of the higher geometry; wherein the doctrine of fluxions is of singular use. We shall give an example or two.

Let ARC (pl. 148, fig. 4.) be a curve of any kind, whose ordinates Rb, CB, are perpendicular to the axis AB. Imagine a right line, bRg, perpendicular to AB, to move parallel to itself from A towards B; and let the velocity thereof, or the fluxion of the absciss, Ab, in any proposed position of that line, be denoted by $\dot{bd}$, then will $\dot{bn}$, the rectangle under bd and the ordinate, bR, express the corresponding fluxion of the generating area, AbR; which fluxion, if A$b=x$, and bR$=y$, will be $y\dot{x}$. From whence, by substituting for y or $\dot{x}$, according to the equation of the curve, and taking the fluent, the area itself, AbR, will become known.

But in order to render this still more plain, we shall give some examples, wherein x, y, z, and u, are all along put to denote the absciss, ordinate, curve-line, and the area respectively, unless where the contrary is expressly specified. Thus, if the area of a right angled triangle be required; put the base AH (fig. 5.)$=a$, the perpendicular HM$=b$, and let AB$=x$, be any portion of the base, considered as a flowing quantity; and let BR$=y$ be the ordinate, or perpendicular corresponding. Then because of the similar triangles, AHM and ABR, we shall have $a : b :: x : y = \frac{bx}{a}$. Whence $y\dot{x}$, the fluxion of the area ABR, is, in this case, equal to $\frac{\dot{bx}x}{a}$; and consequently the fluent thereof, or the area itself, $=\frac{bx^2}{2a}$ which, therefore, when $x=a$, and BR coincides with HM, will become $\frac{ab}{2} = \frac{\text{AH} \times \text{HM}}{2}$ = the area of the whole triangle AHM; as is also demonstrable from the principles of common geometry.

Again, let the curve ARMH (fig. 6.), whose area you would find, be the common parabola; in which case, if AB$=x$, and BR$=y$, and the parameter$=a$; we shall have $y^2=ax$, and $y=a^{\frac{1}{2}}x^{\frac{1}{2}}$: and therefore, $\dot{u}\,(=y\dot{x})=a^{\frac{1}{2}}x^{\frac{1}{2}}\dot{x}$; whence $u=\frac{2}{3}\times a^{\frac{1}{2}}x^{\frac{3}{2}}=\frac{2}{3}$ $a^{\frac{1}{2}}x^{\frac{1}{2}} \times x=\frac{2}{3}yx=\frac{2}{3}\times \text{AB}\times \text{BR}$. Hence a parabola is two-thirds of a rectangle of the same base and altitude.

The same conclusion might have been found more easily in terms of y; for $x=\frac{y^2}{a}$, and $\dot{x}=\frac{2y\dot{y}}{a}$; and consequently $\dot{u}\,(=y\dot{x})=\frac{2y^2\dot{y}}{a}$, whence $u=\frac{2y^3}{3a}=\frac{2y}{3}\times\frac{y^2}{a}=\frac{2y}{3}\times x=\frac{2}{3}\times \text{AB}\times \text{BR}$, as before.

To determine the area of the hyperbolic curve AMRB (fig. 7.), whose equation is $x^m y^n=a^{m+n}$; whence we have $y=a^{\frac{m+n}{n}}\div x^{\frac{m}{n}}=a^{\frac{m+n}{n}}\times x^{\frac{-m}{n}}$; and therefore $\dot{u}\,(=y\dot{x})=a^{\frac{m+n}{n}}\times x^{\frac{m-n}{n}}\dot{x}$, whose fluent is $u=\frac{a^{\frac{m+n}{n}}\times x^{\frac{m-n}{n}}x}{\frac{m+n}{n}\times 1-\frac{m}{n}}=\frac{na^{\frac{m+n}{n}}\times x^{\frac{n-m}{n}}}{n-m}$; which, when $x=0$, will also be $=0$, if n be greater than m; therefore the fluent requires no correction in this case: the area, AMRB, included between the asymptote, AM, and the ordinate BR, being truly defined by $\frac{na^{\frac{m+n}{n}}\times x^{\frac{n-m}{n}}}{n-m}$, as above. But if n be less than m, then the fluent, when $x=0$, will be infinite, because the index $\frac{n-m}{n}$ being negative, 0 becomes a divisor to na^{m+n}; whence the area, AMRB, will also be infinite.

But here, the area, BRH, comprehended between the ordinate, the curve, and the part, BH, of the asymptote, is finite, and will be truly expressed by $\frac{na^{\frac{m+n}{n}}\times x^{\frac{n-m}{n}}}{m-n}$, the same quantity with its signs changed; for the fluxion of the part AMRB, being $a^{\frac{m+n}{n}}\times x^{\frac{-m}{n}}\dot{x}$, that of its supplement BRH must consequently be $-a^{\frac{m+n}{n}}\times x^{\frac{-n}{n}}\dot{x}$, whereof the fluent is $-\frac{a_n^{\frac{m+n}{n}}\times x^{\frac{n-m}{n}}}{1-\frac{m}{n}}=\frac{a^{\frac{m+n}{n}}\times x^{\frac{n-m}{n}}}{m-n}$ = the area, BRH, which wants no correction; because when x is infinite and the area BRH$=0$, the said fluent will also entirely vanish; since the value of $x^{\frac{n-m}{n}}$, which is a divisor to $a^{\frac{m+n}{n}}$, is then infinite.

In spirals CAR, or curves referred to a centre C, fig. 8; put $y=$ any radius CR, $x=$BN the arc of a circle described about the centre C, at any distance CB$=a$, and Cnr another ray indefinitely near CNR: then $\frac{1}{2}$ CN $\cdot$ N$n=\frac{1}{2}a\dot{x}=$CNn, and by

sim. fig. $CN^2 : CR^2$ or $a^2 : y^2 :: CN n : \frac{y^2 \dot{x}}{2a} = CR r$ the fluxion of the area described by the revolving ray CR; then the fluent of this, for any particular case, will be the quadrature of the spiral. So if, for instance, it be Archimedes's spiral, in which $x : y$ in a constant ratio suppose as $m : n$, or $my = nx$, and $y^2 = \frac{n^2 x^2}{m^2}$; hence then $CR r = \frac{y^2 \dot{x}}{2a} = \frac{n^2 x^2 \dot{x}}{2am^2}$ the fluxion of the area; the fluent of which is $\frac{n^2 x^3}{6am^2} = \frac{xy^2}{6a}$ the general quadrature of the spiral of Archimedes.

For a great many more examples consult the treatises on Fluxions, by Simpson, Dealtry, &c.

As to the quadrature of the circle in particular, or the finding a square equal to a given circle, it is a problem that has employed the mathematicians of all ages, but still without the desired success. This depends on the ratio of the diameter to the circumference, which has never yet been determined in precise numbers. Many persons have approached very near this ratio. See CIRCLE.

Strict geometry here failing, mathematicians have had recourse to other means, and particularly to a sort of curves called quadratices: but these being mechanical curves, instead of geometrical ones, or rather transcendental instead of algebraical ones, the problem cannot fairly be effected by them.

Hence recourse has been had to analytics. And the problem has been attempted by three kinds of algebraical calculations. The first of these gives a kind of transcendental quadratures, by equations of indefinite degrees. The second by vulgar numbers, though irrationally such; or by the roots of common equations, which, for the general quadrature, is impossible. The third by means of certain series, exhibiting the quantity of a circle by a progression of terms. See SERIES.

Thus, for example, the diameter of a circle being 1, it has been found that the quadrant, or one-fourth of the circumference, is equal to $\frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9}$, &c. making an infinite series of fractions, whose common numerator is 1, and denominators the natural series of odd numbers; and all these terms alternately will be too great, and too little. This series was discovered by Leibnitz and Gregory. And the same series is also the area of the circle.

If the sum of this series could be found, it would give the quadrature of the circle: but this is not yet done; nor is it at all probable that it ever will be done, though the impossibility has never yet been demonstrated, except Mr. Glenie's recent attempt can be called a demonstration.

To this it may be added, that as the same magnitude may be expressed by several different series, possibly the circumference of the circle may be expressed by some other series, whose sum may be found. And there are many other series, by which the quadrant, or area, to the diameter, has been expressed; though it has never been found that any one of them is actually summable. Such as this series, $1 - \frac{1}{6} - \frac{1}{40} - \frac{1}{112}$, &c. invented by Newton.

Other ingenious series have been invented by Halley, Hutton, &c. for which see Dr. Hutton's excellent Mensuration, and the second volume of his Tracts, now printing.

Dr. Halley's method of computing the ratio of the diameter of the circle to its circumference was considered by himself, and other learned mathematicians, as the easiest the problem admits of. And, although, in the course of a century, much easier methods have been discovered, still a celebrated mathematician of our own times has expressed an opinion, that no other aliquot part of the circumference of a circle can be so easily computed by means of its tangent as that which was chosen by Dr. Halley, viz. the arch of 30 degrees. Without taking upon him to determine whether this opinion be just or not, the Rev. John Hellins has shewn how the series by which Dr. Halley computed the ratio of the diameter to the circumference of the circle may be transformed into others of swifter convergency, and which, on account of the successive powers $\frac{1}{10}$ which occur in them, admit of an easy summation. We shall give the memoir in the author's own words.

"1. The proposed transformation is obtained by means of different forms in which the fluents of some fluxions may be expressed; and to proceed with greater clearness, I will here," says Mr. Hellins, "set down the fluxion in a general form, and its fluent, in the two series which are used in the following particular instance, and may be applied with advantage in similar cases.

"2. The fluent of $\frac{x^{m-1}\dot{x}}{1-x^n}$ is $= \frac{x^m}{m} + \frac{x^{m+n}}{m+n} + \frac{x^{m+2n}}{m+2n} + \frac{x^{m+3n}}{m+3n}$, &c. which series, being of the simplest form which the fluent seems to admit, was first discovered, and probably is the most generally useful. But it has also been found, that the fluent of the same fluxion may be expressed in series of other forms, which, though less simple than that above written, yet have their particular advantages. Amongst those other forms of series which the fluent admits of, that which suits my present purpose is $\frac{x^m}{m.1-x^n} - \frac{nx^{m+n}}{m.m+n.\ 1-x^n}\Big|^2 + \frac{n.2n.x^{m+2n}}{m.m+n.m+2n.1-x^n}\Big|^3 - \frac{n.2n.3n.x^{m+3n}}{m.m+n.m+2n.m+3n.1-x^n}\Big|^4 +$ &c. which, to say nothing of other methods, may easily be investigated by the rule given in p. 64, of the third edition of Emerson's Fluxions; or its equality with the former series may be proved by algebra.

"3. On account of the sign — before x^n, in the last series, it may be proper to remark, that its convergency, by a geometrical progression, will not cease till $\frac{x^n}{1-x^n}$ becomes $= 1$, or x becomes $= \sqrt[n]{\frac{1}{2}}$; and that when x is a small quantity, and n a large number, this series will converge almost as swiftly as the former. For instance, if x be $= \sqrt{\frac{1}{2}}$, and $n = 8$, which are the values in the following case, the former series will converge by the quantity $x^n/=\sqrt{\frac{1}{2}}\Big|^8 = \frac{1}{81}$, and this series by the quantity $\frac{x^n}{1-x^n} = \frac{\frac{1}{81}}{1-\frac{1}{81}} = \frac{1}{80}$; where the difference in convergency will be but little, and the divisions by 80 easier than those by 81.

"4. With respect to the indices m and n, as they are here supposed to be affirmative whole numbers, and will be so in the use I am about to make of them, the reader need not be detained with any observations on the cases in which these fluents will fail, when the indices have contrary signs.

"5. It may be proper further to remark, that by putting $\frac{x^n}{1-x^n} = z$, and calling the first, second, third, &c. terms of the series $\frac{x^m}{m.1-x^n} - \frac{nx^{m+n}}{m.m+n.\overline{1-x^n}^2} + \frac{n.2nx^{m+2n}}{m.m+n.m+2n.\overline{1-x^n}^3} +$ &c. A, B, C, &c. respectively, the series will be expressed in the concise and elegant notation of sir Isaac Newton, viz. $\frac{x^m}{m.1-x^n} - \frac{nzA}{m+n} + \frac{2nzB}{m+2n} - \frac{3nzC}{m+3n} +$ &c. which is well adapted to arithmetical calculation.

"6. I come now to the transformation proposed, which will appear very easy, as soon as the common series, expressing the length of an arch in terms of its tangent, is properly arranged.

"If the radius of a circle be 1, and the tangent of an arch of it be called t, it is well known that the length of that arch will be $= t - \frac{t^3}{3} + \frac{t^5}{5} - \frac{t^7}{7} + \frac{t^9}{9} - \frac{t^{11}}{11} +$ &c. Now, if the affirmative terms of this series be written in one line, and the negative ones in another, the arch will be

$$= \begin{cases} t + \frac{t^5}{5} + \frac{t^9}{9} + \frac{t^{13}}{13} + \frac{t^{17}}{17} + \text{&c.} \\ \frac{t^3}{3} + \frac{t^7}{7} + \frac{t^{11}}{11} + \frac{t^{15}}{15} + \frac{t^{19}}{19} + \text{&c.} \end{cases}$$

And if, again, the first, third, fifth, &c. term of each of these series be written in one line, and the second, fourth, sixth, &c. in another, the same arch will be expressed thus:

$$= \begin{cases} + \begin{cases} t + \frac{t^9}{9} + \frac{t^{17}}{17} + \frac{t^{25}}{25} + \frac{t^{33}}{33} + \text{&c.} \\ \frac{t^5}{5} + \frac{t^{13}}{13} + \frac{t^{21}}{21} + \frac{t^{29}}{29} + \frac{t^{37}}{37} + \text{&c.} \end{cases} \\ - \begin{cases} \frac{t^3}{3} + \frac{t^{11}}{11} + \frac{t^{19}}{19} + \frac{t^{27}}{27} + \frac{t^{35}}{35} + \text{&c.} \\ \frac{t^7}{7} + \frac{t^{15}}{15} + \frac{t^{23}}{23} + \frac{t^{31}}{31} + \frac{t^{39}}{39} + \text{&c.} \end{cases} \end{cases}$$

All which series are evidently of the first form in article 2. and therefore their values may be expressed in the second form there given, or more neatly by the Newtonian notation mentioned in article 5. In each of these series the value of n is 8.

And the value of m, $\begin{cases} \text{in the first series, is } 1; \\ \text{in the second series, is } 5; \\ \text{in the third series, is } 3; \\ \text{in the fourth series, is } 7. \end{cases}$

"If now we take $t = \sqrt{\frac{1}{3}}$, the tangent of 30°, which was chosen by Dr. Halley, we shall have the arch of 30°

$$= \begin{cases} + \begin{cases} \frac{1}{\sqrt{3}} \times :1 + \frac{1}{9.81} + \frac{1}{17.81^2} + \frac{1}{25.81^3} + \frac{1}{33.81^4}, \text{ &c.} \\ \frac{1}{9\sqrt{3}} \times :\frac{1}{5} + \frac{1}{13.81} + \frac{1}{21.81^2} + \frac{1}{29.81^3} + \frac{1}{37.81^4}, \text{ &c.} \end{cases} \\ - \begin{cases} \frac{1}{3\sqrt{3}} \times :\frac{1}{3} + \frac{1}{11.81} + \frac{1}{19.81^2} + \frac{1}{27.81^3} + \frac{1}{35.81^4}, \text{ &c.} \\ \frac{1}{27\sqrt{3}} \times :\frac{1}{7} + \frac{1}{15.81} + \frac{1}{23.81^2} + \frac{2}{31.81^3} + \frac{1}{39.81^4}, \text{ &c.} \end{cases} \end{cases}$$

Six times this quantity will be = the semicircumference when radius is 1, and = the whole circumference when the diameter is 1. If therefore we multiply the last series by 6, and write $\sqrt{12}$ for $\frac{6}{\sqrt{3}}$, and express their value in the form given in article 5. we shall have the circumference of a circle whose diameter is 1,

$$= \begin{cases} + \begin{cases} \frac{81\sqrt{12}}{80} - \frac{8A}{9.80} + \frac{16B}{17.80} - \frac{24C}{25.80} + \frac{32D}{33.80}, \text{ &c.} \\ \frac{81\sqrt{12}}{5.9.80} - \frac{8A}{13.80} + \frac{16B}{21.80} - \frac{24C}{29.80} + \frac{32D}{37.80}, \text{ &c.} \end{cases} \\ - \begin{cases} \frac{81\sqrt{12}}{3.3.80} - \frac{8A}{11.80} + \frac{16B}{19.80} - \frac{24C}{27.80} + \frac{32D}{35.80}, \text{ &c.} \\ \frac{81\sqrt{12}}{7.27.80} - \frac{8A}{15.80} + \frac{16B}{23.80} - \frac{24C}{31.80} + \frac{32D}{39.80}, \text{ &c.} \end{cases} \end{cases}$$

"7. All these new series, it is evident, converge somewhat swifter than by the powers of 80. For in the first series, which has the slowest convergency, the coefficients $\frac{8}{9}$, $\frac{16}{17}$, $\frac{24}{25}$, &c. are each of them less than 1; so that its convergency is somewhat swifter than by the powers of 80.

"8. But another advantage of these new series is, that the numerator and denominator of every term except the first, in each of them, is divisible by 8; in consequence of which, the arithmetical operation by them is much facilitated, the division by 80 being exchanged for a division by 10, which is no more than removing the decimal point. These series, then, when the factors which are common to both numerators and denominators are expunged, will stand as follows (each of which still converging somewhat quicker than by the powers of 80), and we shall have the circumference of a circle whose diameter is 1,

$$\frac{\pi}{4} = \left\{ \begin{array}{l} + \left\{ \begin{array}{l} \frac{81\sqrt{12}}{80} - \frac{A}{9.10} + \frac{2B}{17.10} - \frac{3C}{25.10} + \frac{4D}{33.10}, \text{ \&c.} \\ \frac{9\sqrt{12}}{400} - \frac{A}{13.10} + \frac{2B}{21.10} - \frac{3C}{29.10} + \frac{4D}{37.10}, \text{ \&c.} \end{array} \right. \\ - \left\{ \begin{array}{l} \frac{9\sqrt{12}}{80} - \frac{A}{11.10} + \frac{2B}{19.10} - \frac{3C}{27.10} + \frac{4D}{35.10}, \text{ \&c.} \\ \frac{3\sqrt{12}}{7.80} - \frac{A}{15.10} + \frac{2B}{23.10} - \frac{3C}{31.10} + \frac{4D}{39.10}, \text{ \&c.} \end{array} \right. \end{array} \right.$$

"By which series the arithmetical computation will be much more easy than by the original series."

Some curious series for the same purpose have been recently investigated by Mr. Wallace of the Royal Military College, for which we must refer to his ingenious paper on the subject, in the Edinburgh Transactions.

QUADRATURE, in astronomy, that aspect of the moon when she is 90° distant from the sun; or when she is in a middle point of her orbit, between the points of conjunction and opposition, namely, in the first and third quarters. See ASTRONOMY.

QUADRATURE LINES, are two lines placed on Gunter's sector: they are marked with Q. and 5, 6, 7, 8, 9, 10; of which Q. signifies the side of the square, and the other figures the sides of polygons of 5, 6, 7, &c. sides. S, on the same instrument, stands for the semidiameter of a circle, and 90 for a line equal to ninety degrees in circumference.

QUADRATUS. See DEPRESSOR LABII INFERIORIS. It is also the generic name of various other muscles.

QUADRATUS FEMORIS. (*quadratus*, from *quadra*, a square; so called from its supposed shape.) A muscle of the thigh situated on the outside of the pelvis. It is a flat, thin, and fleshy muscle, but not of the shape its name would seem to indicate. It is situated immediately below the gemini. It arises tendinous and fleshy from the external surface and lower edge of the tuberosity of the ischium, and is inserted by short tendinous fibres into a ridge which is seen extending from the basis of the trochanter major to that of the trochanter minor. Its use is to bring the os femoris outwards.

Q. GENÆ. See PLATISMA MYOIDES.

Q. LABII INFERIORIS. See DEPRESSOR LABII INFERIORIS.

Q. LUMBORUM. Quadratus, seu Lumbaris externus of Winslow. A muscle situated within the cavity of the abdomen. This is a small, flat, and oblong muscle, that has gotten the name of quadratus from its shape, which is that of an irregular square. It is situated laterally, at the lower part of the spine. It arises tendinous and fleshy, from about two inches from the posterior part of the spine of the ilium. From this broad origin it ascends obliquely inwards, and is inserted into the transverse processes of the four superior lumbar vertebræ, into the lower edge of the last rib, and, by a small tendon, that passes up under the diaphragm, into the side of the last vertebra of the back. When this muscle acts singly, it draws the loins to one side; when both muscles act, they serve to support the spine, and perhaps to bend it forwards. In laborious respiration, the quadratus lumborum may assist in pulling down the ribs.

Q. MAXILLÆ INFERIORIS. See PLATYSMA MYODES.

Q. RADII. See PRONATOR RADII QUADRATUS.

QUADREL, in building, a kind of artificial stone, so called from its being perfectly square. The quadrels are made of a chalky earth, &c. and dried in the shade for two years. These were formerly in great request among the Italian architects.

QUADRE'NNIAL. *a.* (*quadrennium*, Latin.) 1. Comprising four years. 2. Happening once in four years.

QUA'DRIBLE. *a.* (from *quadro*, Latin.) That may be squared (*Derham*).

QUADRICAPSULAR PERICARP, in botany, having four capsules to a flower: as in rhodiola.

QUADRIDENTATE DOWN, in botany. A four-toothed down. Having four teeth on the edge. As in rudbeckia.

QUADRIFID CALYX, in botany. A four-cleft perianth: as in rhinanthus.—Quadrifidum folium. A four-cleft leaf. Cut into four segments with linear sinuses, and straight margins.

QUADRIGA, in antiquity, a car or chariot drawn by four horses. On the reverses of medals we frequently see the emperor or victory in a quadriga, holding the reins of the horses; whence these coins are, among the curious, called *nummi quadrigati*, and *victoriati*.

QUADRIJUGOUS LEAF, in botany. Pinnate, with four pairs of leaflets.

QUADRILATERAL, or QUADRILATERAL FIGURE, is a figure comprehended by four right lines; and having consequently also four angles, for which reason it is otherwise called a quadrangle.

The general term quadrilateral comprehends these several particular species or figures, viz. the square, parallelogram, rectangle, rhombus, rhomboides, and trapezium.

If the opposite sides be parallel, the quadrilateral is a parallelogram. If the parallelogram have its angles right ones, it is a rectangle; if oblique, it is an oblique one. The rectangle having all its sides equal, becomes a square; and the oblique parallelogram having all its sides equal, is a rhombus, but if only the opposites be equal, it is a rhomboides. All other forms of the quadrilateral are trapeziums, including all the irregular shapes of it.

The sum of all the four angles of any quadrilateral is equal to four right angles. Also, the two opposite angles of a quadrilateral in-

scribed in a circle taken together, are equal to two right angles. And in this case the rectangle of the two diagonals, is equal to the sum of the two rectangles of the opposite sides. For the properties of the particular species of quadrilaterals, see their respective names, SQUARE, RECTANGLE, PARALLELOGRAM, RHOMBUS, RHOMBOIDES, and TRAPEZIUM.

QUADRILA'TERALNESS. *s.* The property of having four rightlined sides.

QUADRILLE. (*quadrillo*, Span. a party of four persons.) A game at cards played by four persons, the number of cards being forty; to effect which the tens, nines, and eights are discarded in each suit from the pack. The deal is made by distributing the cards to each player, three at a time, for any two rounds, and once four a time, beginning with the right-hand player, who is the elder hand.

The stakes, consisting of several equal billets or contracts comprising the counters and fishes, are distributed among the players, who agree upon their value, as also upon the number of tours, which are usually ten. After the trump is named, the right-hand player leads, and if the ombre, either alone or with a friend, win all the tricks, he gains the vole, or if six tricks, the game; but if he get only five tricks he loses by remise, and if only four, loses by codill. The game, consolation, matadores, bastos, and other payments are variously regulated, according as the game is won or lost. The holder of either of the red aces is entitled to a fish for each.

The chief rules are as follows:

1. When you are the ombre, and your friend leads from a mat, play your best trump, and then lead the next best the first opportunity.

2. If you possess all the trumps, keep leading them, except you have other certain winning cards.

3. If all the mats be not revealed by the time you have won six tricks, do not risk playing for the vole.

4. When you are the friend called, and hold only a mat, lead it, but if only a mat guarded by a small trump, lead the small one; though when the ombre is last player, lead the best trump you have.

5. Punto in red, or king of trumps in black, are good cards to lead when they are your best, and should either of them succeed, then play a small trump.

6. When the ombre leads to discover the friend, if you hold king, queen, and knave, put on the knave.

7. Preserve the called suit, whether friend or foe.

8. When playing against a lone hand, never lead a king, unless you have the queen, nor change the suit, nor permit, if possible to prevent it, the ombre to be last player.

9. Call on the strongest suits, except you have a queen guarded, and if elder hand you have a better chance than when middle hand.

10. A good player may succeed with a weaker hand when either elder or younger, better than if middle hand.

The rank of the cards when not trumps.

Clubs and spades.	Hearts and diamonds.
King,	King,
Queen,	Queen,
Knave,	Knave,
Seven,	Ace,
Six,	Deuce,
Five,	Three,
Four,	Four,
Three,	Five,
Deuce.	Six,
	Seven.
In all 9.	In all 10.

The rank and order of the trumps.

Clubs and spades.	Hearts and diamonds.
Spadille, the ace of spades.	Spadille, the ace of spades.
Manille, the deuce of spades, or of clubs.	Manille, the seven of hearts, or of diamonds.
Basto, the ace of clubs.	Basto, the ace of clubs.
	Punto, the ace.
King,	King,
Queen,	Queen,
Knave,	Knave,
Seven,	Deuce,
Six,	Three,
Five,	Four,
Four,	Five,
Three.	Six.
In all 11.	In all 12.

N. B.—Spadille and basto are always trumps; by which the red suits have one trump more than the black.

There are three matadores, viz. spadille, manille, and basto, which force all inferior trumps, but if an ordinary trump be led, you are not obliged to play a matadore; though if spadille be led, and you hold manille or basto unguarded, you must play it; also if manille be led, and you have basto unguarded, that must be played.

1. The first thing, after you have seen your cards, is, to ask leave; to pass; or play *sans prendre*; and if you name a wrong trump, you must abide by it.

2. If all the players pass, he who has spadille is obliged to play (called forced spadille;) but if he do not make three tricks, he is not basted.

3. The player, when he calls a king, ought to have a fair probability of winning three tricks, to prevent being basted.

4. Therefore, such games only are set down as give a fair chance to win by calling a king with directions at the end of each what to lead.

Calculations for those who have made some progress in the game.

1. What are the odds that my partner holds one out of any two cards?

Ans. That he holds one card out of any two certain cards, is about 5 to 4 in his favour; and if you hold one matadore, those odds are in your favour that your partner holds one of the other two, and consequently you may play your game accordingly.

Again, suppose you call a king, having a knave and one small card of another suit in your hand, you have 5 to 4 in your favour that your partner holds either the king or queen of that suit; and consequently you have the odds in your favour to win a trick in the same.

2. What are the odds that my partner holds one out of any three certain cards?

Ans. That he holds one out of any three certain cards, is about 5 to 2 in his favour; and if you have no matadore, but with the assistance of one of them have great odds to win the game; observe, that it is about 5 to 2 that your partner holds one of them, you having none.

This calculation may be applied to many other cases.

Games in red, calling a king.

1. Spadille, manille, two small hearts or diamonds, the queen of clubs, and one small one, and four small cards of the other suit. Lead a small trump.

2. Spadille, manille, two small hearts or diamonds, with the knave and two small clubs, and three small cards of the other suits. Lead a small trump.

3. Spadille, manille, two small hearts or diamonds, three small clubs, and three small cards of the other suits. Lead a small trump.

4. Spadille, punto, king, queen, and one small heart or diamond, three small clubs, the queen, and one spade. Lead punto.

5. Spadille, punto, king, knave, and one small heart or diamond, the knave and two small clubs, and two small spades. Lead punto.

6. Spadille, king, queen, knave, and one small heart or diamond, with the queen, knave, and one small club, and two small spades. Lead the king of trumps.

7. Spadille, three, four, five, and six of hearts or diamonds, king of clubs and one more, queen and two small spades; when you have the lead play a small trump; in the second lead play a spadille.

8. Manille, basto, punto, and two small hearts or diamonds, three small clubs, and the knave and one spade. Lead manille.

9. N. B. Manille, basto, king, and two small hearts or diamonds, queen and one small club, and three small spades. Lead manille.

10. N. B. Manille, basto, queen, and two small hearts or diamonds, queen and two small clubs, knave and one spade. Lead manille.

11. Manille, basto, with the three smallest hearts or diamonds, queen and one small club, knave and two small spades. Play a small trump.

12. N. B. Manille, punto, king, and two small hearts or diamonds, queen knave, and one small club, king, and one small spade. Lead manille.

13. Manille, punto, queen, and two small hearts or diamonds, queen and one small club, king and two small spades. Play a small trump.

14. Manille, punto, and three small hearts or diamonds, knave and one small club, king, queen, and one small spade. Play a small trump.

15. Manille, and the four smallest hearts or diamonds, queen and one small club, king, queen, and one small spade. Play a small trump.

16. N. B. Basto, punto, king, and two small hearts or diamonds, king and queen of clubs, queen and two small spades. Lead basto.

17. N. B. Basto, punto, queen, and two small hearts or diamonds, queen, knave, and one small club, king and queen of spades. Lead basto.

18. N. B. Basto, punto, and three of the smallest hearts or diamonds, king and queen of clubs, queen, knave, and one small spade. Play a small trump.

19. Basto, and the four smallest hearts or diamonds, king and queen of clubs, queen, knave, and one small spade. Play a small trump.

20. N. B. Punto, king, queen, and two small hearts or diamonds, king and queen of clubs, queen, knave, and one small spade. Lead punto.

21. Punto, king, and three small hearts or diamonds, king and queen of clubs, queen, knave and one small spade. Play a small trump.

Games in black, calling a king.

1. Spadille, manille, and two small clubs or spades, the knave and two small hearts, and three small diamonds. Lead a small trump.

2. N. B. Spadille, manille, and two small clubs or spades, queen and two small hearts, and three small diamonds. Lead a small trump.

3. Spadille, manille, and two small clubs or spades, three small hearts, three small diamonds. Lead a small trump.

4. N. B. Spadille, king, queen, and two small clubs or spades, with the queen and one small heart, three small diamonds. Lead the king of trumps.

5. Spadille, king, knave, and two small clubs, queen and two diamonds, two small hearts. Play a small trump.

6. Spadille, queen, and three small clubs or spades, queen and two small hearts, two small diamonds. Play a small trump.

7. Spadille, and the four smallest clubs or spades, king and one small heart, queen and two small diamonds. Play a small trump.

8. Manille, basto, king, and two small clubs or spades, three small hearts, and two small diamonds. Lead manille.

9. Manille, basto, queen, and two small

clubs or spades, three small hearts, queen and one small diamond. Lead manille.

10. Manille, basto, knave, and two small clubs or spades, knave and one heart, three small diamonds. Lead manille.

11. Manille, basto, and the three small clubs or spades, queen, and two small hearts, knave and one small diamond. Lead manille.

12. N. B. Manille, king, queen, and two small clubs or spades, king and one small heart, queen, knave, and one small diamond. Lead manille.

13. N. B. Manille, king, knave, and two small clubs or spades, king and one small heart, queen and two small diamonds. Lead manille.

14. Manille, king, and three small clubs or spades, queen and two small hearts, king and one small diamond. Play a small trump.

15. Manille, and the four smallest clubs or spades, king, queen, and one small heart, two small diamonds. Play a small trump.

16. N. B. Basto, king, queen, and two small clubs or spades, queen and two small hearts, king and one small diamond. Lead basto.

17. N. B. Basto, king, knave, and two small clubs or spades, knave and one heart, king and two small diamonds. Lead basto.

18. N. B. Basto, king, and three small clubs or spades, king and queen of hearts, queen and two small diamonds. Play a small trump.

19. Basto, and four of the smallest clubs or spades, king and queen of hearts, queen, knave and one small diamond. Play a small trump.

20. N. B. King, queen, knave, and two small clubs or spades, king and queen of hearts, knave and two small diamonds. Lead the king of trumps.

21. King, queen, seven, six, and five of clubs or spades, king and queen of hearts, queen, knave, and one small diamond. Lead the king of trumps.

Those cases, both in red and black, which are marked thus (N. B.) are very good games to play, and you have the odds on your side to win those which are not marked.

N. B.—You are to call to your strongest suit, except you have a queen guarded. And if you are elder hand, you have a fairer chance to win the game than if middle, because leading a trump frequently makes your adversaries play against each other.

The following are the laws of the game.

1. The cards are to be dealt to the right hand, by fours and threes, and no otherwise; and the dealer is at liberty to begin by four or three; if in dealing there should come one or more faced cards, there must be a new deal, unless the last card.

2. If there be too many or too few cards in the pack, there must be a new deal.

3. He who deals wrong, is to deal again.

4. He who has asked leave is obliged to play.

5. No one is basted for playing out of turn, but the card played may be called at any time in that deal, provided it do not cause a renounce; or either of the adversaries may demand the partner of him who played out of his turn, or his own partner, to play any suit he thinks fit.

6. The three matadores cannot be forced by an inferior trump, but the superior forces the inferior, when lead by a first player.

7. Whoever names any suit for trumps, must abide by it.

8. If you play with eleven cards, you are basted.

9. If you play *sans prendre*, or have matadores, you are to demand them before the next dealer has finished, otherwise you lose the benefit.

10. Any person naming his trump without asking leave, is obliged to play *sans prendre*, unless he is the younger hand, and all the rest have passed.

11. After the game is won, if the person who won the sixth trick play the seventh card, he is obliged to play for the *vole*.

12. If you have four kings dealt, you are at liberty either to call a queen to one of your kings, except the queen of trumps; or to call one of your kings.

13. If any person separate a card from the rest, he ought to play it, if the adverse party have seen it, unless he plays *sans prendre*.

14. If the king call, or his partner play out of his turn, no *vole* is to be played for.

15. No person is to be basted for a renounce, unless the trick is turned and quitted; and if any person renounce, and be discovered, should the player happen to be basted by such renounce, all the parties are to take up their cards, and play them over again.

16. Forced spadille is not obliged to make three tricks, nor is allowed to play for the *vole*.

17. Whoever undertakes to play the *vole*, has the preference of playing before him who offers to play *sans prendre* only.

18. If all parties agree to it, let the person have the preference of playing who plays for the most tricks, which will prevent small games.

19. The ombre is entitled to know his king called, before he declares for the *vole*.

20. When six tricks are won, he who won the sixth ought to say, I play the *vole*; or, I do not play the *vole*; or, I ask ———, and nothing else.

21. He who wins the *vole*, is to take double the stake played for out of the pool.

22. He who asks leave (if elder hand), may play *sans prendre*, in preference to any of the other players.

23. If you have one or more kings, you may call yourself, but must win six tricks.

24. If you play the king surrendered, he must win six tricks who demands the king of any person.

25. He who has passed once (unless he has spadille) has no right to play afterwards; also

he who has asked is obliged to play, unless somebody else plays *sans prendre*.

26. If the ombre, or his friend, show their cards before they have won six tricks, the adversaries may call their cards as they please.

27. Whoever has only asked leave, cannot play *sans prendre*, unless forced.

28. You are at liberty to look at the tricks when you are to lead, but not otherwise.

29. Whoever undertakes playing for the *vole*, and does not succeed, has a right to the stakes *sans prendre*, and matadores if he has them, having won his game.

30. Any person discovering his game, is not entitled to play for the *vole*.

31. If there happen to be two cards of the same sort, and found out before the deal is ended, the deal is void, but not otherwise.

32. Nobody is to declare how many trumps are played out.

33. He who calls and does not make three tricks, is to be basted alone, unless forced spadille.

Glossary.

Alone. See *Sans Appeller.*

To ask leave; to ask leave to play with a partner by calling a king.

Basto; the ace of clubs, which is always the third trump, and from which the following term is derived.

Baste; a penalty, which consists in paying as many counters as there are down; and is incurred either by renouncing, or by not winning, when you stand the game, which is called making the baste.

Cheville; to be between the eldest hand and the dealer.

Codill; when those who defend the pool make more tricks than they who stand the game, the former are said to win codill, and the latter to lose it.

Consolation; a claim, which is always paid by those who lose to those who win, whether by codill or remise.

Devolve; when he who stands the game does not make a trick.

To do more; is when any player having asked leave, is required by a younger hand either to pass or play alone.

Double. To play double, is to pay the game and the stake double, as well as the consolation, the *sans prendre*, the matadores, and the devolve.

Force. The ombre is said to be forced, when you play a strong trump to weaken him, if he overtrump; he is likewise said to be forced, when he asks leave, and one of the other players, by offering to play *sans prendre*, obliges him to play *sans prendre*, or pass.

Friend; the player who has the king called.

Impasse; when, being in cheville, you play the knave of a suit of which you have the king.

Manille; in black, the deuce of spades, or clubs; in red, the seven of hearts or diamonds; it is always the second trump.

Mark; the fish put down by the dealer.

Matadores or Mats; spadille, manille, and basto, which are the three first trumps. *False matadores* are any sequence of trumps, following the matadores regularly.

Mille; mark of ivory; stands for ten fish.

Ombre; the name given to him who stands the game, either by calling or by playing *sans appeller*, or *sans prendre*.

Party; the duration of the game, according to the number of tours agreed upon.

Pass; a term used when you have not a hand to play.

Ponto or *Punto*; the ace of diamonds, when diamonds are trumps; or of hearts, when these are trumps; and it is then the fourth trump.

Pool. The pool consists of the fishes, which are staked for the deals, or the counters which are put down by the players, or the bastes that go on the game. To defend the pool, is to be against him who stands the game.

Prise; a number of fishes or counters given to each player at the beginning of the party.

Regle; the order observed at the game; it is called, being in regle, when the ombre trumps the return of the king called.

Remise; when they who stand the game do not make more tricks than they who defend the pool; and they then lose by remise.

Renounce; is not to play in the suit led, when you have it: it is also called a renounce, when, not having any of the suit led, you win with a card that is the only one you have of that suit in which you play.

Reprise, the same as party.

Reporte, the same as remise.

Roy rendu, the king surrendered; the method of playing, when the king called is exchanged with the ombre, for which a fish is paid and some other card given by him who is with that to win the game alone.

Spadille; the ace of spades, which is always the first trump. *Forced spadille* is when he who has it is obliged to play; all the other players having passed.

Sans appeller. This imports without calling; and is when you play without calling a king.

Sans prendre, the same as *sans appeller*. *Forced sans prendre* is, when, having asked leave, one of the players offers to play *sans prendre*; in which case you are obliged to play *sans prendre*, or to pass.

Tenace; to wait with two trumps, that you must necessarily make when he that has two others is obliged to lead; such are the two black aces, with regard to manille and punto.

Tours; counters put down by the winners, to mark the number of games played.

Vole; gaining all the tricks either with a friend or alone.

In order to vary this game, some introduce the mediateur, either with or without the favourite suit; the first term signifies a king, which any person may demand, in order to play *sans prendre*, giving in return some other card, and a fish; but if the king be of the fa-

vourite suit, then two fishes are to be paid. The favourite suit is determined by drawing a card at the commencement of the party; and during the whole game, each player, asking leave in that, has a preference before others who have a good hand in a different suit, unless a mediateur is demanded, when it takes the lead; and if in the favourite suit, first; those who play alone, without the mediateur, precede even that, and, when in the favourite, take place of all.

Solitaire quadrille is where it is agreed not to call, but always play *sans prendre*, with or without the mediateur; and if in any deal no one can play alone, then the cards are to be dealt again, and such additions made to the stake as may have been settled.

Solitaire quadrille by three, or tredille, is by throwing out all (except the king of one, and only the six of the other red suit); each person playing on their own account, as at three-handed whist.

QUADRILOBATE LEAF, in botany, a four-lobed leaf. Divided to the middle into four distant parts, with convex margins.

QUADRILOCULAR PERICARP, in botany, a four-celled pericarp: as in euonymus.

QUA'DRIN. *s.* (*quadrinus*, Lat.) A mite; a small piece of money, in value about a farthing (*Bailey*).

QUADRINO'MICAL. *a.* (*quatuor* and *nomen*, Lat.) Consisting of four denominations.

QUADRIPA'RTITE. *a.* (*quatuor* and *partitus*, Lat.) Having four parts; divided into four parts.

QUADRIPA'RTITELY. *ad.* In a quadripartite distribution.

QUADRIPARTITION. *s.* A division by four, or the taking the fourth part of any quantity.

QUADRIPHY'LLOUS. *a.* (*quatuor* and φυλλον.) Having four leaves.

QUADRIRE'ME. *s.* (*quadriremis*, Lat.) A galley with four banks of oars.

QUADRISY'LLABLE. *s.* (*quatuor* and *syllable*.) A word of four syllables.

QUADRIVA'LVES. *s.* (*quatuor* and *valvæ*, Lat.) Doors with four folds.

QUADRI'VIAL. *a.* (*quadrivium*, Latin.) Having four ways meeting in a point.

QUADRUPED. (*quadrupes*, Latin.) In its simplest and most general meaning a four-footed animal. But as such an interpretation must include a prodigious multiplicity of animals of very different habits and structures, as for example not only hoofed and clawed land-animals, but lizards, tortoises, frogs and other amphibious reptiles, and perhaps various kinds of insects, it has been necessary, in the study of natural history, to limit its meaning, in order to be able to apply it to any definite purpose, and hence it has been generally restrained to such animals as have not only four feet, but a hairy body, produce viviparously, and suckle their young.

Thus explained, Aristotle divided quadrupeds into three sections, solid-hoofed, cloven, and digitated. And under this general view quadrupeds continued to be treated till the publication of Mr. Ray's Synopsis Methodica in 1693: in which they are divided into two classes, each of which classes contains several orders, as follows:

The classed consist of,

I. Hoofed.

II. Clawed, or digitate.

The first class is divided into the two orders of,

i. Whole-hoofed.

ii. Divided-hoofed.

i. The *whole-hoofed* are exemplified in the horse, ass, onager or wild ass, mule, zebra, &c. Of this order Aristotle has observed that none of them have horns, or the bones of the foot called talus, and astragalus; and that the males of none of them have any appearance of teats. This last observation, however, is not perfectly correct; for the horse has an appearance of this kind, but in an organ where few people would think of looking for it, for the teat of the male horse is situate on the penis.

ii. *The divided-hoofed* are still further subpartitioned into 1. διχηλα, *bisulcate*; and 2. τετραχηλα, *quadrusulcate*.

1. The *bisulcate* consist of quadrupeds whose hoof is separated into two parts only: of which there are two kinds—

α. Ruminant, or chewers of the cud.

β. Non-ruminant, or that do not chew the cud.

α. Of the ruminant, or cud-chewing kind, we may take examples from the ox, uroch, bison, and buffalo; the sheep, goat, deer, and rabbit.

β. The non-ruminant include the swine tribes, and their numerous varieties, but no others.

2. The *quadrusulcate* consist of quadrupeds whose hoofs are cloven into four sections, all of which seem to be non-ruminant, as the rhinoceros, hippopotamus, tapir, and capybara.

II. The second class, comprising the *clawed*, or *digitate* quadrupeds, is subdivided as follows:

i. Quadrupeds possessing two fissures or toes, but without nails; as the camel kind, which ruminate, and, like other ruminating animals, have complicated stomachs.

ii. Quadrupeds possessing many fissures, whether toes or claws.

1. Undivided, as in the elephant, which is also a ruminant animal.

2. Divided, as in various kinds, as follows.

α. With broad nails and a human shape, as the monkey tribes.

β. With narrower and more pointed nails, as the dog, cat, rabbit, and similar kinds, and which are sub-distinguished by the number and structure of the fore-teeth.

It must be obvious to every one, that though the leading characters are natural, there is no small complexity in the sub-distinctions of this

arrangement. The most striking features, perhaps, are in the possession of a mammary, or suckling organ, and of teeth: for we have already observed that the attribute of four feet belongs certainly to various amphibials, and perhaps to various insects, as well as to quadrupeds properly so called. And hence Linnéus, banishing the term quadruped altogether from the regions of his own system, as too indistinct and indefinite, has made choice of these features as the foundation of this system, employing the term mammalia, mammals, or suckling animals, instead of quadrupeds, for the class; and arranging the orders of which the mammalian class consists, according to the number, structure, and position of the fore-teeth.

Even this system, however, is not without its inconvenience: for the whale tribes, the narwhal, and dolphin, are also mammalian animals, although they differ from all other mammals in structure and habit; being destitute of feet, and proper nostrils, and living constantly in the water.

For this system, however, as for various others upon the same subject, the reader must turn to the articles PHYSIOLOGY and ZOOLOGY.

QUA'DRUPED. *a.* Having four feet (*Watts*).

QUA'DRUPLE. *a.* (*quadruplus*, Latin.) Fourfold; four times told (*Raleigh*).

To QUADRU'PLICATE. *v. a.* (*quadruplico*, Latin.) To double twice; to make fourfold.

QUADRUPLICA'TION. *s.* (from *quadruplicate*.) The taking a thing four times.

QUA'DRUPLY. *ad.* (from *quadruple*.) To a fourfold quantity (*Swift*).

QUÆ'RE. (Latin.) Inquire; seek.

QUÆSTOR. See QUESTOR.

To QUAFF. *v. a.* (from *coëffer*, French, to be drunk.) To drink; to swallow in large draughts (*Shakspeare*).

To QUAFF. *v. n.* To drink luxuriously.

QUA'FFER. *s.* (from *quaff*.) He who quaffs.

To QUA'FFER. *v. a.* To feel out (*Derham*).

QUA'GGY. *a.* Boggy; soft; not solid (*Ainsworth*).

QUA'GMIRE. *s.* (that is, *quakemire*.) A shaking marsh; a bog that trembles under the feet (*More*).

QUAID. *part.* Crushed; dejected; depressed (*Spenser*).

To QUAIL. *v. n.* (*quelen*, Dutch.) 1. To languish; to sink into dejection (*Herbert*). 2. To fade; to decline (*Hakewill*).

To QUAIL. *v. a.* (cpellan, Saxon.) To crush; to quell: not used (*Spenser*).

QUAIL, in ornithology. See TETRAO.

Quails are to be taken by means of the call during their whole wooing time, which lasts from April to August. The proper times for using the call are at sun-rising, at nine o'clock in the morning, at three in the afternoon, and at sun-set; for these are the natural times of the quail's calling. The notes of the cock and hen quail are very different; and the sportsman who expects to succeed in the taking them must be expert in both: for, when the cock calls, the answer is to be made in the hen's note; and when the hen calls, the answer is to be made in the cock's. By this means they will come up to the person, so that he may with great ease throw the net over them and take them. If a cock quail be single, on hearing the hen's note he will immediately come; but if he has a hen already with him, he will not forsake her. Sometimes, though only one quail answers to the call, there will three or four come up; and then it is best to have patience, and not run to take up the first, but stay till they are all entangled, as they will soon be.

The quail is a neat cleanly bird, and will not run much into dirty or wet places: in dewy mornings, they will often fly instead of running to the call; and in this case, it is best to let them go over the net, if it so happens that they fly higher than its top; and the sportsman then changing sides, and calling again, the bird will come back, and then will probably be taken in the net.

The calls are to be made of a small leather purse, about two fingers wide, and four fingers long, and made in the shape of a pear; this is to be stuffed half full of horse-hair, and at the end of it is to be placed a small whistle, made of the bone of a rabbit's leg, or some such other bone: this is to be about two inches long, and the end formed like a flageolet, with a little soft wax. This is to be the end fastened into the purse; the other is to be closed up with the same wax, only that a hole is to be opened with a pin, to make it give a distinct and clear sound. To make this sound, it is to be held full in the palm of the hand, with one of the fingers placed over the top of the wax; then the purse is to be pressed, and the finger is to shake over the middle of it, to modulate the sound it gives into a sort of shake. This is the most useful call; for it imitates the note of the hen-quail, and seldom fails to bring a cock to the net if there be one near the place.

The call that imitates the note of the cock, and is used to bring the hen to him, is to be about four inches long, and above an inch thick; it is to be made of a piece of wire turned round and curled, and covered with leather; and one end of it must be closed up with a piece of flat wood, about the middle of which there must be a small thread or strap of leather, and at the other end is to be placed the same sort of pipe, made of bone, as is used in the other call. The noise is made by opening and closing the spiral, and gives the same sound that the cock does when he gives the hen a signal that he is near her.

QUA'ILPIPE. *s.* (*quail* and *pipe*.) A pipe with which fowlers allure quails (*Addison*).

QUAINT. *a.* (*coint*, French.) 1. Nice; scrupulously, minutely, superfluously; exact (*Sidney*). 2. Subtile; artful: obsolete (*Cha.*). 3. Neat; pretty; exact (*Shakspeare*). 4. Subtly excogitated; finespun (*Milton*). 5. Affected; foppish (*Swift*).

QUAI'NTLY. *ad.* (from *quaint.*) 1. Nicely; exactly; with petty elegance (*B. Jonson*). 2. Artfully (*Shakspeare*).

QUAI'NTNESS. *s.* (from *quaint.*) Nicety; petty elegance (*Pope*).

To QUAKE. *v. n.* (cpacon, Saxon.) 1. To shake with cold or fear; to tremble (*Sha.*). 2. To shake; not to be solid or firm (*Pope*).

QUAKE. *s.* (from the verb.) A shudder; a tremulous agitation (*Suckling*).

QUAKERS, a religious society, which took its rise in England about the middle of the 17th century, and rapidly found its way into other countries in Europe, and into the English settlements in North America.—Their founder, George Fox, an illiterate shoemaker, made his first appearance as a preacher about the year 1648. The nation was then greatly agitated by religious controversies, and numerous errors arose on the demolition of the ecclesiastical and civil constitution. The character of Fox was harmless, and he appears to have been an honest visionary, though some writers accuse him of making himself equal to Christ. He acquired several followers; and in the year 1650, being brought before two justices in Derbyshire for opposing a minister in the exercise of his duty, one of the magistrates, by way of jeer, gave to them the name of *quakers*; an appellation which has stuck to them ever since, though they themselves adopted, and still retain, the term of *friends*. Robert Barclay and William Penn are the greatest names which this society can boast; the former wrote a masterly apology for their doctrines, to which he prefixed a remarkable address to king Charles II. Penn wrote several books, the chief of which is that entitled, No Cross No Crown, showing that the way to obtain the heavenly crown is by being willing to bear the cross.

These were writers of considerable learning and abilities, to whom may be added Sewell, the historian, who wrote an account of this people, first in Dutch, and afterwards in English. It may also be proper to mention, of later time, Anthony Pruver, who having been brought up (like Fox) in the employment of a shepherd, and a shoemaker, afterwards acquired so much knowledge in the dead languages, as to translate the whole of the Scriptures into English. It must be admitted, however, that the quakers, as a body, have produced few learned or scientific authors; and this reason may be assigned, that they avoid sending their children to public schools, and train them principally to mechanical or commercial employments, prefering the useful to the ornamental in their education. In medicine, nevertheless, the only learned profession which is open to them in Great Britain, they have had many who have attained and adorned the degree of doctor, among whom the learned world will readily recognize the name of Fothergill.

It is somewhat difficult to give an accurate account of their tenets, as they have no standard confession of faith. They have, however, so lately as 1790, published a summary view of their doctrines: from which we learn, in brief, that the friends believe in one eternal God, and in Jesus Christ, his Son, the Messiah and Mediator of the new covenant. They acknowledge the divinity of Christ, who is the wisdom and power of God unto salvation. To Christ alone they give the title of the word of God, and not to the Scriptures, but they highly esteem those sacred writings, in subordination to the spirit, from which they were given forth. They believe that, in order to enable men to put in practice the most excellent precepts of the gospel, every man is endued with a measure of the light, grace, or good spirit of Christ, by which he is enabled to distinguish good from evil, and to correct those corrupt propensities of his nature which mere reason is insufficient to overcome. They believe that the influence of the spirit of Christ is necessary to enable them acceptably to worship; and that to wait for it, when met in silence, is their proper business. They ascribe all true ministry to the same source, the immediate influence of the Holy Spirit. They reject, or disuse, baptism with water and the supper: the former as pertaining, according to John the Baptist's avowal, to a decreasing dispensation, and having been merely typical of spiritual baptism: the latter rite they do not consider as maintaining communion between Christ and his church; which is only obtained by a real participation of his divine nature through faith. As this society lays so much stress on the inward persuasion of the mind, effected by the operation of the light of Christ; and as they believe that lively faith is not at man's command, but is the gift of God in Christ, although nourished by man's obedience to its discoveries; they are so far from requiring of such as request admission among them, or such as are employed in the service of their church, any of those articles or formulas of faith, which are too often the means of inducing an insincere compliance, that they make no use of such forms at all. They say in their summary, "We prefer the judging of men by their fruits, and depending on the aid of him who, by his prophet, hath promised to be a spirit of judgment to him that sitteth in judgment. Without this, there is a danger of receiving numbers into outward communion, without any addition to that spiritual sheepfold, whereof our blessed Lord hath declared himself to be both the door and the shepherd—that is, of such as know his voice, and follow him in the paths of obedience."

In their public worship, all is performed in silence, unless some believe themselves inwardly moved to speak; and, except during the time of prayer by one so moved, the men sit covered at liberty. Their marriages, after due enquiry, are performed by the parties taking each other in a meeting, and the company subscribe as witnesses. Their burials are equally simple; but frequently preaching takes place on both occasions. The quakers believe it wrong for Christians to use such flattering titles to men, as your grace, your excellency, the right honourable, reverend, and the like, to

use compliments, or to adopt, for flattery's sake, the custom of saying the plural you, to one person. Neither do they allow of kneeling or uncovering the head in respect to any man, reserving these gestures for divine worship. They condemn gaiety and superfluity of apparel, public diversions, gaming, sports, and unnecessary frequenting of public-houses. They also disuse those names of the months and days, which, having been given in honour of the false gods or heroes of the heathens, originated in their superstition or flattery; and they believe it forbidden to Christians to swear or to fight on any occasion.

The sobriety of their dress is a good contrast to the ever-varying modes of a degenerate age. Their guarded and decent language, and regular deportment, however uncouth to light and superficial minds, must excite admiration in the liberal and intelligent observer. The excellent manner in which they govern their families and bring up their children in an acquiescence with their restraints and customs, may be recommended as deserving imitation. The quakers have exerted themselves with great zeal in procuring an abolition of the slave trade in this country; and have long ago so far set the example of emancipation in America, that there is scarcely a quaker in that continent possessing a slave. Though they are, as has been mentioned, restrained by their principles from attempting to serve their country in its wars, they have always proved themselves good subjects of the state, and have experienced from the British government many acts of indulgence.

A system of discipline has been established among this people, which has been admired, even by their adversaries; the object of it is, the relief of their poor—the maintenance of good order—the support of their testimonies, which they believe it is their duty to bear to the world—and the help and recovery of such as are overtaken in faults. This discipline is laid down in the rules which their yearly meeting has issued from time to time; and is carried into effect at their monthly meetings, which are composed of members living at a convenient distance, and sometimes of several small congregations for worship. All their monthly meetings in one county (or, in some instances, in two or three adjacent counties) form a quarterly meeting, which has the immediate superintendance of the monthly meetings. The quarterly meetings in their turn are superintended by the yearly meeting. The yearly meeting requires of the quarterly meetings, and these latter of their monthly meetings, answers, at stated times, to certain queries, by which means the circumstances of the inferior meeting is made known to the superintending one. The monthly meetings send representatives to the quarterly meetings, and these, to the yearly meeting. The yearly meeting for Great Britain is held in London in the spring, to which come representatives from the yearly meeting in Ireland. The American continent, on which there are numerous settlements of the Friends, comprises six other yearly meetings, namely, New England, New York, Pennsylvania, Maryland, Virginia, and the Carolinas, &c. These yearly meetings are no otherwise bound to each other than by similarity of principle, and yet (though this similarity is doubtless the cause) no dispute on any point of faith has yet arisen between them; and it is not unusual for ministers of one country to spend much time in travelling in that character in the other, in which the certificates from the meetings to which he belongs at home secure him a reception. These are certificates of concurrence signed in the monthly meeting to which the minister belongs; and if the proposed journey extend beyond the limit of his yearly meeting, it is necessary to have the joint concurrence of his quarterly meeting, and also of his fellow-ministers and elders assembled at their yearly meeting. It may be here remarked, that among the quakers, women, as well as men, fill the station of minister; and, with the before-mentioned concurrence, are often engaged in travelling from place to place.

The quakers have charity schools in some parts of the kingdom; but at Ackworth in Yorkshire they have a large school, under the direction of their yearly meeting, in which about one hundred and eighty boys, and one hundred and seventy girls, are boarded and educated.

This society experienced at its outset violent opposition, and was cruelly persecuted during the times of Cromwell and of Charles II. although the Friends do not impeach the character of either, as being the springs of the persecution. In New England, the government put four of them to death; but farther executions of that sect were stopped by the interference of king Charles. The Friends, however, did not flinch, either in England or America; and as they seem to have borne persecution with as much patience as any people, so, when in their turn they came into power, they never shewed any disposition to persecute others. For William Penn, who founded Pennsylvania, laid down the widest plan of religious liberty that had then been devised, and reserved no privileges for his own society in the government of his province.

For more on the subject of this denomination of christians, the reader may consult Clarkson's Portraiture of Quakerism, and the works of Bevan, one of the society of Friends.

QUALEA, in botany, a genus of the class monandria, order monogynia. Calyx four-parted, corol two-petalled; berry undecided. Two species; forest-trees of Guiana.

QUALIFICA'TION. *s.* (*qualification*, Fr.) 1. That which makes any person or thing fit for any thing (*Swift*). 2. Accomplishment (*Atterbury*). 3. Abatement; diminution (*Raleigh*).

QUALIFICATION, in sporting, an annual fine paid to the legislature to possess the liberty of shooting, hunting, or coursing, upon the receipt of which a certificate of such receipt is

given by the proper officer; or it implies the possession of landed estate to a certain amount, or a manorial deputation from such possessor, the one or the other of which is presupposed upon the payment of the annual fine. This qualification (or exemption from the penalties of former acts during different reigns) till of very late years, consisted in the full and unrestrained possession of one hundred pounds per annum, issuing from freehold land, or estate, and producing that clear annual sum when every other expence was paid: or, the possession of a leasehold estate of one hundred and fifty pounds per annum, in right of self or wife, for the term of ninety-nine years, or any term beyond that period.

The fine is derived from a statute of the present reign which enacts, That every person in Great Britain who shall use any dog, gun, net, or other engine, for the taking or destruction of game, shall take out an annual certificate, from the clerk of the peace for the county in which he resides, and shall pay for such certificate the sum of three pounds three shillings, with one shilling to the clerk for his trouble in making it out.

QUALIFICATION also appertains to the sport of racing upon the turf, and the term is used in a peculiar signification. Plates of 50l. are given at numerous sporting places, to be run for on certain conditions; some by colts and fillies of three years old; some by those of four years old; others of five and six; and, lastly, by horses of all ages and qualifications. The precise meaning of which last expression is, that a horse equal in age to one or more of his competitors, yet superior in other points, must have his powers attempted to be equalized, by so increasing the weight which he is to carry above the standard of the others, that the superiority in speed may still remain doubtful, and an equal hope be indulged of winning the prize for which they are to start. To render such equalizing scale the less liable to objection, it is an usual custom to give notice in the advertisements that a winner of one plate in the present year is to carry 3lb. the winner of two, 5lb. and of three or more 7lb. extra.

To QUA'LIFY. *v. a.* (*qualifier*, French.) 1. To fit for any thing (*Swift*). 2. To furnish with qualifications (*Shakspeare*). 3. To make capable of any employment or privilege: as, he is *qualified* to kill game. 4. To abate; to soften; to diminish (*Raleigh*). 5. To ease; to assuage (*Spenser*). 6. To modify; to regulate (*Brown*).

QUA'LITY. *s.* (*qualitas*, Lat.) 1. Nature relatively considered (*Hooker*). 2. Property; accidental adjunct (*Bentley*). 3. Particular efficacy (*Shakspeare*). 4. Disposition; temper (*Shakspeare*). 5. Virtue or vice (*Dryden*). 6. Accomplishment; qualification (*Clarendon*). 7. Character (*Bacon*). 8. Comparative or relative rank (*Temple*). 9. Rank; superiority of birth or station (*Shakspeare*). 10. Persons of high rank (*Pope*).

QUALITY. (*qualitas.*) That affection of a thing whence it is denominated such; or that which occasions a thing to affect our senses in this or that manner, and gives it this or that denomination. Accordingly quality is said to be an attribute, from which no substance is exempt. See MODE.

Thus, that power in fire, whatever it be, whereby it excites in us the sensation of heat, since it is that whence the fire is denominated hot, is called the quality of fire.

The word quality, *qualitas*, is said to have been first introduced into the Latin by Cicero: till his time the Romans studiously avoided using a term which denoted an abstract; and in lieu thereof only considered the concrete, signified by *quale*. The like is observed of the ancient Greeks, who did not use ποιοτης, but ποιον.

Quality, it is to be observed, is an ambiguous term; and has been applied to some things which ought rather to have been looked upon as states of matter, or assemblages of several qualities; as life, health, beauty, &c.

There are, also, other attributes, as size, shape, motion, and rest, usually reckoned among qualities, which might more conveniently be ranked among the primary modes of the parts of matter; since from these simple attributes all the qualities are derived.

The ancient school-philosophers distinguish quality in the general, which they call metaphysical and predicamental quality, into essential and accidental. The moderns, more usually, divide it into spiritual and corporeal.

Spiritual qualities, or *qualities of the soul*, are affections of the mind, considered as in this or that habitude or disposition. Of these they make two kinds; the one belonging to the understanding, the other to the will: of the former kind are knowledge, opinion, certainty, doubting, &c. Of the latter, are all the moral virtues and vices.

Qualities corporeal or physical, are what we chiefly consider under this denomination, and to which the definition above laid down is accommodated.

Philosophers are divided as to the nature of these qualities, or what they are in the body. The general language of the Peripatetic school is, that they are things distinct from the bodies themselves; and are superadded to them, or flow from their substantial forms: on which principle, they hold qualities to be real, and denominate them accidents; supposing them to be inherent in substances, though not in the relation of parts, but to be sustained thereby as in a subject, and incapable of subsisting without them. In effect, the Thomists define qualities to be accidents following or arising from the form; in the same manner as quality is an accident following or arising from the substance.

The moderns absolutely explode the notion of qualities distinct from the body; and insist, that the powers whereby bodies excite in us the ideas of such qualities are no other than the mechanical affections of the bodies themselves, viz. the figure, magnitude, motion, &c. of the parts whereof they consist.

Sensible qualities are such as are the more immediate object of the senses: as figure, taste, colour, smell, hardness, &c.

Occult qualities, among the ancients, were such as did not admit of a rational solution in their way.

Dr. Keil demonstrates, that every quality which is propagated in orbem, such as light, heat, cold, odour, &c. has its efficacy or intensity either increased, or decreased, in a duplicate ratio of the distances from the centre of radiation inversely. So at double the distance from the earth's centre, or from a luminous or hot body, the weight or light or heat, is but a 4th part; and at 3 times the distance, they are 9 times less, or a 9th part, &c.

QUALM. *s.* (cpealm, Saxon.) A sudden fit of sickness; a sudden seizure of sickly languor (*Calamy*).

QUA'LMISH. *a.* (from *qualm.*) Seized with sickly languor (*Dryden*).

QUAMOCLIT, in botany. See IPOMEA.

QUANDA'RY. *s.* (*qu'en dirai je*, French. *Skinner.*) A doubt; a difficulty.

QUANGA. See CAPRA.

QUANG-PING, a city of China, of the first rank, in the province of Pe-tche-li, 212 miles S.S.E. of Peking. Lon. 114. 30 E. Lat. 36. 47 N.

QUANG-SI, a province of China, bounded on the N. by Koei-tcheou and Hou-quang, W. by Yunnan, and the kingdom of Tonquin, S. by the gulf of Tonquin and the province of Quang-tong, and E. by the same and Houquang. The southern part is a flat country, and well cultivated; but the northern is full of mountains covered with trees, and have mines of gold, silver, copper, and tin. It is watered by several rivers, and produces so much rice, as to supply the inhabitants of Quang-tong for six months in the year. Here is a singular tree, which, instead of pith, contains a soft pulp, that yields a kind of flour; and the bread made of it is said to be exceedingly good. Beside paroquets, hedge-hogs, and the rhinoceros, a prodigious number of wild animals, curious birds, and uncommon insects are found here. Quei-ling is the capital.

QUANG-TONG. See CANTON.

QUA'NTITIVE. *a.* (*quantitivus*, Latin.) Estimable according to quantity (*Digby*).

QUA'NTITY. *s.* (*quantité*, Fr. *quantitas*, Latin.) 1. That property of any thing which may be increased or diminished (*Cheyne*). 2. Any indeterminate weight or measure. 3. Bulk or weight (*Dryden*). 4. A portion; a part (*Shakspeare*). 5. A large portion (*Arbuthnot*). 6. The measure of time in pronouncing a syllable (*Holder*).

QUANTITY, according to the first of the above acceptations, is that property of any thing which may be increased or diminished. This interpretation of the word is certainly just, and for the purposes of common conversation it is sufficiently determinate; but the man of science may expect to find in a work like ours a definition of the thing signified. This, however, cannot be given him. A logical definition consists of the genus under which the thing defined is ranked, and the specific difference (see LOGIC); but quantity is ranked under no genus. In that school where such definitions were most valued, it was considered as one of the ten categories, or general conceptions, under which all the objects of human apprehension were mustered, like soldiers in an army (see CATEGORY and PHILOSOPHY). On this account, even Aristotle himself, who delighted in definitions, and was not easily deterred from a favourite pursuit, could not consistently with his own rules attempt to define quantity. He characterises it, however, in several parts of his works; and particularly in the 15th chapter of the 4th book of his Metaphysics, where he gives the following account of the three first categories: *Ταυτα μεν γαρ, ων μια ἡ ουσια· ὁμοια δ' ων ἡ ποιοτης μια· ισα δε, ων το ποσον εν.* Things are the same, of which the substance is one; similar, of which the quality is one; equal, of which the quantity is one. Again, he tells us that the chief characteristic of quantity is, that it may be denominated equal and unequal.

That any man can become wiser by reading such descriptions as these, none but an idolater of Aristotle will suppose. There is, indeed, no periphrases by which we can explain what is meant by quantity to those who have not previously formed such a notion.—All that can be done by making the attempt is only to settle language, by stating exactly the cases in which we use this word in the greatest conformity to general custom; for there is a laxness or carelessness of expression in the language of most men, and our notions are frequently communicated by speech in a way by no means precise; so that it is often a great chance that the notions excited in the mind of the hearer are not exact counterparts of those in the mind of the speaker.

The understandings of men differ in nothing more remarkably than in their power of abstraction, and of rapidly forming conceptions so general and simple as not to be clogged with distinguishing circumstances, which may be different in different minds while uttering and hearing the same words: and it is of great consequence to a man of scientific habits, either to cultivate, if possible, this talent, or to supersede its use, by studiously forming to himself notions of the most important universals in his own course of contemplation, by careful abstraction of every thing extraneous. His language by this means becomes doubly instructive by its extreme precision; and he will even judge with greater certainty of notions intended to be communicated by the more slovenly language of another person.

We cannot say that there is much ambiguity in the general use of the term quantity: but here, as in all other cases, a love of refinement, of novelty, and frequently of vanity, and the wish of appearing ingenious and original, have made men take advantage of even the small latitude with which the careless use of the word will furnish them, to amuse themselves and the public by giving the appearance of science to empty sounds.

Mathematics is undoubtedly employed in discovering and stating many relations of quantity; and it is in this category alone that any thing is contemplated by the mathematician, whether in geometry, arithmetic, or algebra. Hence mathematics has been called the science of quantity. The simplicity of the object of the mathematician's contemplation, and unparalleled distinctness with which he can perceive its modifica-

tions, have enabled him to erect a body of science, eminent not only for its certainty, but also for the great length to which he can carry his reasonings without danger of error; and the intimate connection which this science has with the arts of life, and the important services which it has performed, have procured it a most respectable place in the circle of the sciences. Ingenious men have availed themselves of this preeminence of mathematics, and have endeavoured to procure respect for their disquisitions on other subjects, by presenting them to the public as branches of mathematical science, and therefore susceptible of that accuracy and certainty, which are its peculiar boast. Our moral affections, our sensations, our intellectual powers, are all susceptible of augmentation and diminution, are conceivable as greater and less when stated together, and are familiarly spoken of as admitting of degrees of comparison. We are perfectly well understood when we say that one pain, heat, grief, kindness, is greater than another; and as this is the distinguishing characteristic of quantity, and as quantity is the subject of mathematical discussion, we suppose that these subjects may be treated mathematically. Accordingly, a very celebrated and excellent philosopher (Dr. F. Hutchinson), has said, among many things of the same kind, that the greatness of a favour is in the direct compound ratio of the service performed and the dignity of the performer, and the inverse ratio of the merit and rank of the receiver; that the value of a character is in the compound ratio of the talents and virtue, &c.; and he has delivered a number of formal propositions on the most interesting questions in morals, couched in this mathematical language, and even expressed by algebraic formulæ. But this is mere play, and conveys no instruction. We understand the words; they convey no absurdity; and in as far as they have a sense, we believe the propositions to be true. But they give no greater precision to our sentiments than the more usual expressions would do. If we attend closely to the meaning of any one of such propositions, we shall find that it only expresses some vague and indistinct notions of degrees of those emotions, sentiments, or qualities, which would be just as well conceived by means of the expressions of ordinary language; and that it is only by a sort of analogy or resemblance that this mathematical language conveys any notions whatever of the subjects.

The object of contemplation to the mathematician is not whatever is susceptible of greater and less, but what is measurable; and mathematics is not the science of magnitude, in its most abstracted and general acceptation, but of magnitude which can be measured. It is, indeed, the science of measure, and whatever is treated in the way of mensuration is treated mathematically. Now, in the discourse of ordinary life and ordinary men, many things are called quantities which we cannot or do not measure. This is the case in the instances already given of the affections of the mind, pleasure, pain, beauty, wisdom, honour, &c. We do not say that they are incapable of measure; but we have not yet been able to measure them, nor do we think of measuring them when we speak rationally and usefully about them. We therefore do not consider them mathematically; nor can we introduce mathematical precision into our discussions of these subjects till we can, and actually do, measure them. Persons who are precise in their expression will even avoid such phrases on these subjects as suppose, or strictly express, such measurement. We should be much embarrassed how to answer the question, how much pain does the tooth-ache give you just now; and how much is it easier since yesterday? Yet the answer (if we had a measure) would be as easy as to the question, how many guineas did you win at cards? or, how much land have you bought? Nay, though we say familiarly, "I know well how much such a misfortune would affect you," and are understood when we say it, it would be awkward language to say, "I know well the quantity of your grief." It is vain, therefore, to expect mathematical precision in our discourse or conceptions of quantities in the most abstracted sense. Such precision is confined to quantity which may be and is measured. It is only trifling with the imagination when we employ mathematical language on subjects which have not this property.

It will therefore be of some service in science to discriminate quantities in this view; to point out what are susceptible of measure and what are not.

What is measure? It is one of these two things: it is either finding out some known magnitude of the thing measured, which we can demonstrate to be equal to it; or to find a known magnitude of it, which being taken so many times shall be equal to it. The geometer measures the contents of a parabolic space when he exhibits a parallelogram of known dimensions, and demonstrates that this parallelogram is equal to the parabolic space. In like manner, he measures the solid contents of an infinitely extended hyperbolic spindle, when he exhibits a cone of known dimensions, and demonstrates that three of these cones are equal to the spindle.

In this process it will be found that he actually subdivides the quantity to be measured into parts of which it consists, and states these parts as actually making up the quantity, specifying each, and assigning its boundaries. He goes on with it, piece by piece, demonstrating the respective equalities as he goes along, till he has exhausted the figure, or considered all its parts.—When he measures by means of a submultiple, as when he shows the surface of a sphere to be equal to four of its great circles, he stops, after having demonstrated the equality of one of these circles, to one part of the surface: then he demonstrates that there are other three parts, each of which is precisely equal to the one he has minutely considered. In this part of the process he expressly assigns the whole surface into its distinct portions, of which he demonstrates the equality.

But there is another kind of geometrical measurement which proceeds on a very different principle. The geometer conceives a certain individual portion of his figure, whether line, angle, surface, or solid, as known in respect to its dimensions. He conceives this to be lifted from its place, and again laid down on the adjoining part of the figure, and that it is equal to the part which it now covers; and therefore that this part together with the first is double of the first: he lifts it again, and lays it down on the next adjoining part, and affirms that this, added to the two former, make up a quantity triple of the first. He goes on in this way, making similar inferences, till he can demonstrate that he has in this man-

ner covered the whole figure by twenty applications, and that his moveable figure will cover no more; and he affirms that the figure is twenty times the part employed.

This mode is precisely similar to the manner of practical measurement in common life: we apply a foot rule successively to two lines, and find that 30 applications exhaust the one, while it requires 35 to exhaust the other. We say, therefore, that the one line is 30 and the other 35 feet long; and that these two lines are to each other in the ratio of 30 to 35. Having measured two shorter lines by a similar application of a stick of an inch long 30 times to the one and 35 times to the other, we say that the ratio of the two first lines is the same with that of the two last. Euclid has taken this method of demonstrating the fourth proposition of the first book of his celebrated elements.

But all this process is a fiction of the mind, and it is the fiction of an impossibility. It is even inconceivable, that is, we cannot in imagination make this application of one figure to another; and we presume to say, that, if the elements of geometry cannot be demonstrated in some other way, the science has not that title to pure, abstract, and infallible knowledge, which is usually allowed it. We cannot suppose one of the triangles lifted and laid on the other, without supposing it something different from a triangle *in abstracto*. The individuality of such a triangle consists solely in its being in the precise place where it is, and in occupying that portion of space. If we could distinctly conceive otherwise, we should perceive that, when we have lifted the triangle from its place, and applied it to the other, it is gone from its former place, and that there is no longer a triangle there. This is inconceivable, and space has always been acknowledged to be immoveable. There is therefore some logical defect in Euclid's demonstration. We apprehend that he is labouring to demonstrate, or rather illustrate, a simple apprehension. This indeed is the utmost that can be done in any demonstration (see METAPHYSICS): but the mode by which he guides the mind to the apprehension of the truth of his fourth proposition is not consistent either with pure mathematics, or with the laws of corporeal nature. The real process as laid down by him, seems to be this. We suppose something different from the abstract triangle; some thing that, in conjunction with other properties, has the property of being triangular, with certain dimensions of two of its sides and the included angle. It has avowedly another property, not essential to, and not contained in, the abstract notion of a triangle, viz. mobility. We also suppose it permanent in shape and dimensions, or that although, during its motion, it does not occupy the same space, it continues, and all its parts, to occupy an equal space. In short, our conception is very mixed, and does not perceptibly differ from our conception of a triangular piece of matter, where the triangle is not the subject, but an adjunct, a quality. And when we suppose the application made, we are not in fact supposing two abstract triangles to coincide. This we cannot do with any thing like distinctness; for our distinct conception now is, not that of two triangles coinciding, but of one triangle being now exactly occupied by that moveable thing which formerly occupied the other. In short, it is a vulgar measurement, restricted by suppositions which are inadmissible in all actual measurements in the present universe, in which no moveable material thing is known to be permanent, either in shape or magnitude.

This is an undeniable consequence of the principle of universal gravitation, and the compressibility of every kind of tangible matter with which we are acquainted. Remove the brass rule but one inch from its place; its gravitation to the earth and to the rest of the universe is immediately changed, and its dimensions change of consequence. A change of temperature will produce a similar effect; and this is attended to and considered in all nice mensurations. We do the best we can to assure ourselves that our rule always occupies a sensibly equal space; and we must be contented with chances of error which we can neither perceive nor remove.

We might (were this a proper place) take notice of some other logical defects in the reasoning of this celebrated proposition: but they are beside our present purpose of explaining the different modes of mathematical measurement, with the view of discovering that circumstance in which they all agree, and which (if the only one) must therefore be the characteristic of mensuration.

We think that the only circumstance in which all modes of mensuration agree, or the only notion that is found in them all, is, that the quantity is conceived as consisting of parts, distinguishable from each other, and separated by assignable boundaries; so that they are at once conceived separately and jointly. We venture to assert that no quantity is directly measured which we cannot conceive in this way, and that such quantities only are the immediate objects of mathematical contemplation, and should be distinguished by a generic name. Let them be called mathematical quantities. Extension, duration, number, and proportion, have this characteristic, and they are the only quantities which have it. Any person will be convinced of the first assertion by attending to his own thoughts when contemplating these notions. He will find that he conceives every one of them as made up of its own parts, which are distinguishable from each other, and have assignable boundaries, and that it is only in consequence of involving this conception that they can be added to or subtracted from each other; that they can be multiplied, divided, and conceived in any proportion to each other.

He may perhaps find considerable difficulty in acquiring perfectly distinct notions of the mensurability, and the accuracy of the modes of mensuration. He will find that the way in which he measures duration is very similar to that in which he measures space or extension. He does not know, or does not attend to, any thing which hinders the brass foot-rule in his hand from continuing to occupy equal spaces during his use of it, in measuring the distance of two bodies. In like manner he selects an event which nature or art can repeat continually, and in which the circumstances which contribute to its accomplishment are invariably the same, or their variations and their effects are insensible. He concludes that it will always occupy an equal portion of time for its accomplishment, or always last an equal time. Then, observing that, during the event whose duration he wishes to measure, this standard event is accomplished $29\frac{1}{2}$ times, and that it is repeated $365\frac{1}{4}$ times during the accomplishment of another event, he affirms that the

durations of these are in the ratio of 29½ to 365¼. It is thus (and with the same logical defect as in the measuring a line by a brass rod) that the astronomer measures the celestial revolutions by means of the rotation of the earth round its axis, or by the vibrations of a pendulum.

We are indebted for most of the preceding observations to Dr. Reid, the celebrated author of the Inquiry into the Human Mind on the Principles of Common Sense, and of the Essays on the Intellectual and Active Powers of Man. He has published a dissertation on this subject in the 45th volume of the Philosophical Transactions, No. 489, which we recommend to our philosophical readers as a performance eminent for precision and acuteness. If we presume to differ from him in any trivial circumstance, it is with that deference and respect which is due to his talents and his worth.

Dr. Reid justly observes, that as nothing has proportion which has not either extension, duration, or number, the characters of mathematical quantity may be restricted to these three. He calls them proper quantities, and all others he calls improper. We believe that, in the utmost precision of the English language, this denomination is very apposite, and that the word quantity, derived from *quantum*, always supposes measurement: but the word is frequently used in cases where its original is not kept in view, and we use other words as synonymous with it, when all mensuration, whether possible or not, is out of our thoughts. According to practice, therefore, the *jus et norma loquendi*, there seems to be no impropriety in giving this name, in our language at least, to whatever can be conceived as great or little. There is no impropriety in saying that the pain occasioned by the stone is greater than that of the tooth-ache; and when we search for the category to which the assertion may be referred, we cannot find any other than quantity. We may be allowed therefore to say, with almost all our scientific countrymen, that every thing is conceivable in respect of quantity which we can think or speak of as greater and less; and that this notion is the characteristic of quantity as a genus, while measurableness is the characteristic of mathematical quantity as a species.

But do we not measure many quantities, and consider them mathematically, which have not this characteristic of being made up of their own distinguishable parts? What else is the employment of the mechanician, when speaking of velocities, forces, attractions, repulsions, magnetic influence, chemical affinity, &c. &c.? Are not these mathematical sciences? And if the precision and certainty of mathematics arise from the nature of their specific object, are not all the claims of the mechanician and physical astronomer ill-founded pretensions? These questions require and deserve a serious answer.

It is most certain that we consider the notions which are expressed by these terms velocity, force, density, and the like, as susceptible of measure, and we consider them mathematically.

Some of these terms are nothing but names for relations of measurable quantity, and only require a little reflection to shew themselves such. Velocity is one of these. It is only a name expressing a relation between the space described by a moving body and the time which elapses during its description. Certain moderate rates of motion are familiar to us. What greatly exceeds this, such as the flight of a bird when compared with our walking, excites our attention, and this excess gets a name. A motion not so rapid as we are familiar with, or as we wish, also gets a name; because in this the excess or defect may interest us. We wish for the flight of the hawk; we chide the tardy pace of our messenger; but it is scientific curiosity which first considers this relation as a separate object of contemplation, and the philosopher must have a name for it. He has not formed a new one, but makes use of a word of common language, whose natural meaning is the combination of a great space with a short time. Having once appropriated it, in his scientific vocabulary, to this very general use, it loses with him its true signification. Tardity would have done just as well, though its true meaning is diametrically opposite; and there is no greater impropriety in saying the tardity of a cannon bullet than in saying the velocity of the hour-hand of a watch. Velocity is a quality or affection of motion, the notion of which includes the notions of space and duration (two mathematical quantities), and no other. It does not therefore express a mathematical quantity itself, but a relation, a combination of two mathematical quantities of different kinds; and as it is measurable in the quantities so combined, its measure must be a unit of its own kind, that is, an unit of space as combined with an unit of time.

Density is another word of the same kind, expressing a combination of space with number. *Densæ arbores* means trees standing at a small distance from each other; and the word is used in the same sense when we say that quicksilver is denser than water. The expression always suggests to the reflecting mind the notions of particles and their distances. We are indeed so habituated to complicated views of things, that we can see remote connections with astonishing rapidity; and a very few circumstances are sufficient for leading forward the mind in a train of investigation. Common discourse is a most wonderful instance of this. It is in this way that we say, that we found by weighing them that inflammable air had not the sixth part of the density of common air. Supposing all matter to consist of equal atoms equally heavy, and knowing that the weight of a bladder of air is the sum of the weights of all the atoms, and also knowing that the vicinity of the atoms is in a certain proportion of the number contained in a given bulk, we affirm that common air is more than six times denser than inflammable air; but this rapid decision is entirely the effect of habit, which makes us familiar with certain groups of conceptions, and we instantaneously distinguish them from others, and thus think and discourse rationally. The Latin language employs the word *frequens* to express both the combination of space and number, and that of time and number.

There are perhaps a few more words which express combinations of mathematical quantities of different kinds; and the corresponding ideas or notions are therefore proper and immediate subjects of mathematical discussion: but there are many words which are expressive of things, or at least of notions, to which this way of considering them will not apply. All those affections or qualities of external bodies, by which they are conceived to act on each other, are of this kind: impulsive force, weight, centripetal

and centrifugal force, magnetical, electrical, chemical attractions and repulsions; in short, all that we consider as the immediate causes of natural phenomena. These we familiarly measure, and consider mathematically.

What was said on this subject in the article PHYSICS will give us clear conceptions of this process of the mind. These forces or causes are not immediate objects of contemplation, and are known only by and in the phenomena which we consider as their effects. The phenomenon is not only the indication of the agency of any cause, and the characteristic of its kind, but the measure of its degree. The necessary circumstances in this train of human thought are, 1st, The notion of the force as something susceptible of augmentation and diminution. 2d, The notion of an inseparable connection of the force with the effect produced, and of every degree of the one with a corresponding degree of the other. From these is formed the notion that the phenomenon or effect is the proper measure of the force or cause. All this is strictly logical.

But when we are considering these subjects mathematically, the immediate objects of our contemplation are not the forces which we are thus treating. It is not their relations which we perceive, and which we combine with such complication of circumstances and certainty of inference as are known in all other sciences: by no means; they are the phenomena only, which are subjects of purely mathematical discussion. They are motions, which involve only the notions of space and time; and when we have finished an accurate mathematical investigation, and make our affirmation concerning the forces, we are certain of its truth, because we suppose the forces to have the proportions and relations, and no other, which we observe in the phenomena. Thus, after having demonstrated, by the geometrical comparison of the lines and angles and surfaces of an ellipse, that the momentary deflection of the moon from the tangent of her orbit is the 3600th part of the simultaneous deflection of a stone from the tangent of its parabolic path; Newton affirms, that the force by which a particle of the moon is retained in her orbit is the 3600th part of the weight of a particle of the stone; and having farther shown, from fact and observation, that these momentary deflections are inversely as the squares of the distances from the centre of the earth, he affirms, that all this is produced by a force which varies its intensity in this manner.

Now all this investigation proceeds on the two suppositions mentioned above, and the measures of the forces are in fact the measures of the phenomena. The whole of physical astronomy, and indeed the whole of mechanical philosophy, might be taught and understood, without ever introducing the word force, or the notion which it is supposed to express: for our mathematical reasonings are really about the phenomena, which are subjects purely mathematical.

The precision, therefore, that we presume to affirm to attend these investigations, arises entirely from the measurable nature of the quantities which are the real objects of our contemplation, and the suitableness and propriety of the measures which we adopt in our comparisons.

Since, then, the phenomena are the immediate subjects of our discussion, and the operating powers are only inferences from the phenomena considered as effects, the quantity ascribed to them must also be an inference from the quantity of the effect, or of some circumstance in the effect. The measure, therefore, of the cause, or natural power or force, cannot be one of its own parts; for the whole and the part are equally unperceived by us. Our measure, therefore, must be a measure of some interesting part, or of the only interesting part of the phenomenon. It is therefore in a manner arbitrary, and depends chiefly on the interest we take in the phenomenon. It must, however, be settled with precision, so that all men in using it may mean the same thing. It must be settled, therefore, by the description of that part or circumstance of the phenomenon which is characteristic of the natural power. This description is the definition of the measure.

Thus Newton assumes as his measure of the centripetal force, the momentary deviation from uniform rectilineal motion. Others, and sometimes Newton himself, assumes the momentary change of velocity, which again is measured by twice this deviation. These measures, being thus selected, are always proper in a mathematical sense; and if strictly adhered to, can never lead us into any paralogism. They may, however, be physically wrong: there may not be that indissoluble connection between the phenomenon and the supposed cause. But this is no mathematical error, nor does it invalidate any of our mathematical inferences: it only makes them useless for explaining the phenomenon by the principle which we adopted; but it prepares a modification of the phenomenon for some more fortunate application of physical principles.

All that can be desired in the definitions or descriptions of these measures is, that they may not deviate from the ordinary use of the terms, because this would always create confusion, and occasion mistakes. Dr. Reid has given an example of an impropriety of this kind, which has been the subject of much debate among the writers on natural philosophy. We mean the measure of the force inherent in a body in motion. Descartes, and all the writers of his time, assumed the velocity produced in a body as the measure of the force which produces it; and observing that a body, in consequence of its being in motion, produces changes in the state or motion of other bodies, and that these changes are in the proportion of the velocity of the changing body, they asserted that there is in a moving body a *vis insita*, an inherent force, and that this is proportional to its velocity; saying that its force is twice or thrice as great, when it moves twice or thrice as fast at one time as at another. But Leibnitz observed, that a body which moves twice as fast, rises four times as high, against the uniform action of gravity; that it penetrates four times as deep into a piece of uniform clay; that it bends four times as many springs, or a spring four times as strong, to the same degree; and produces a great many effects which are four times greater than those produced by a body which has half the initial velocity. If the velocity be triple, quadruple, &c. the effects are nine times, 16 times, &c. greater; and, in short, are proportional, not to the velocity, but to its square. This observation had been made before by Dr. Hooke, who has enumerated a prodigious variety of important cases in which this proportion of effect is observed. Leibnitz, therefore, affirmed, that the force inherent in a moving body is proportional to the square of the velocity.

It is evident that a body, moving with the same velocity, has the same inherent force, whether this be employed to move another body, to bend springs, to rise in opposition to gravity, or to penetrate a mass of soft matter. Therefore these measures, which are so widely different, while each is agreeable to a numerous class of facts, are not measures of this something inherent in the moving body which we call its force, but are the measures of its exertions when modified according to the circumstances of the case; or, to speak still more cautiously and securely, they are the measures of certain classes of phenomena consequent on the action of a moving body. It is in vain, therefore, to attempt to support either of them by a demonstration. The measure itself is nothing but a definition. The Cartesian calls that a double force which produces a double velocity in the body on which it acts. The Leibnitzian calls that a quadruple force which makes a quadruple penetration. The reasonings of both in the demonstration of a proposition in dynamics may be the same, as also the result, though expressed in different numbers.

But the two measures are far from being equally proper: for the Leibnitzian measure obliges us to do continual violence to the common use of words. When two bodies moving in opposite directions meet, strike each other, and stop, all men will say that their forces are equal, because they have the best test of equality which we can devise. Or when two bodies in motion strike the parts of a machine, such as the opposite arms of a lever, and are thus brought completely to rest, we and all men will pronounce their mutual energies by the intervention of the machine to be equal. Now, in all these cases, it is well known that a perfect equality is found in the products of the quantities of matter and velocity. Thus a ball of two pounds, moving with the velocity of four feet in a second, will stop a ball of eight pounds moving with the velocity of one foot per second. But the followers of Leibnitz say, that the force of the first ball is four times that of the second.

All parties are agreed in calling gravity a uniform or invariable accelerating force; and the definition which they give of such a force is, that it always produces the same acceleration, that is, equal accelerations in equal times, and therefore produces augmentations of velocity proportionable to the times in which they are produced. The only effect ascribed to this force, and consequently the only thing which indicates, characterises, and measures it, is the augmentation of velocity. What is this velocity, considered not merely as a mathematical term, but as a phenomenon, as an event, a production by the operation of a natural cause? It cannot be conceived any other way than as a determination to move on for ever at a certain rate, if nothing shall change it. We cannot conceive this very clearly. We feel ourselves forced to animate, as it were, the body, and give it not only a will and intention to move in this manner, but a real exertion of some faculty in consequence of this determination of mind. We are conscious of such a train of operations in ourselves; and the last step of this train is the exertion or energy of some natural faculty, which we, in the utmost propriety of language, call force. By such analogical conception, we suppose a something, an energy, inherent in the moving body; and its only office is the production and continuation of this motion, as in our own case. Scientific curiosity was among our latest wants, and language was formed long before its appearance: as we formed analogical conceptions, we contented ourselves with the words already familiar to us, and to this something we gave the name force, which expressed that energy in ourselves which bears some resemblance (in office at least) to the determination of a body to move on at a certain rate. This sort of allegory pervades the whole of our conceptions of natural operations, and we can hardly think or speak of any operation without a language, which supposes the animation of matter. And, in the present case, there are so many points of resemblance between the effects of our exertions and the operations of nature, that the language is most expressive, and has the strongest appearance of propriety. By exerting our force, we not only move and keep in motion, but we move other bodies. Just so a ball not only moves, but puts other bodies in motion, or penetrates them, &c.—This is the origin of that conception which so forcibly obtrudes itself into our thoughts, that there is inherent in a moving body a force by which it produces changes in other bodies. No such thing appears in the same body if it be not in motion. We therefore conclude, that it is the production of the moving force, whatever that has been. If so, it must be conceived as proportional to its producing cause. Now this force, thus produced or exerted in the moving body, is only another way of conceiving that determination which we call velocity, when it is conceived as a natural event. We can form no other notion of it. The *vis insita*, the determination to move at a certain rate, and the velocity, are one and the same thing, considered in different relations.

Therefore the *vis insita corpori moventi*, the determination to move at a certain rate, and the velocity, should have one and the same measure, or any one of them may be taken for the measure of the other. The velocity being an object of perception, is therefore a proper measure of the inherent force; and the propriety is more evident by the perfect agreement of this use of the words with common language. For we conceive and express the action of gravity as uniform, when we think and say that its effects are proportional to the times of its action. Now all agree, that the velocity produced by gravity is proportional to the time of its action. And thus the measure of force, in reference to its producing cause, perfectly agrees with its measure, independent of this consideration.

But this agreement is totally lost in the Leibnitzian doctrine; for the body which has fallen four times as far, and has sustained the action of gravity twice as long, is said to have four times the force.

The quaintness and continued paradox of expression which this measure of inherent force leads us into, would have quickly exploded it, had it not been that its chief abettors were leagued in a keen and acrimonious warfare with the British mathematicians who supported the claim of sir Isaac Newton to the invention of fluxions. They rejoiced to find in the elegant writings of Huygens a physical principle of great extent, such as this is, which could be set in comparison with some of the wonderful discoveries in Newton's Principia. The fact, that in the action of elastic bodies on each other the product of the masses and the squares of the ve-

locities remain always the same (which they call the *conservatio virium vivarum*) is of almost universal extent; and the knowledge of it enabled them to give ready and elegant solutions of the most abstruse and intricate problems, by which they acquired a great and deserved celebrity. Dr. Robert Hooke, whose observation hardly any thing escaped, was the first (long before Huygens) who remarked, that in all the cases of the gradual production and extinction of motion, the sensible phenomenon is proportional to he square of the produced or extinguished velocity.

John Bernoulli brought all these facts together, and systematised them according to the principle advanced by Huygens in his treatise on the centre of oscillation. He and Daniel Bernoulli gave most beautiful specimens of the prodigious use of this principle for the solution of difficult physical problems in their dissertations on the motion and impulse of fluids, and on the communication of motion. It was however very early objected to them (we think by marquis Poleni), that in the collision of bodies perfectly hard there was no such *conservatio virium vivarum*; and that in this case, the forces must be acknowledged to be proportional to the velocities. The objections were unanswerable.—But John Bernoulli evaded their force, by affirming that there were and could be no bodies perfectly hard. This was the origin of another celebrated doctrine, on which Leibnitz greatly plumed himself, the law of continuity, viz. that nothing is observed to change abruptly, or *per saltum*. But no one will pretend to say that a perfectly hard body is an inconceivable thing; on the contrary, all will allow that softness and compressibility are adjunct ideas, and not in the least necessary to the conception of a particle of matter, nay totally incompatible with our notion of an ultimate atom.

Sir Isaac Newton never could be provoked to engage in this dispute. He always considered it as a wilful abuse of words, and unworthy of his attention. He guarded against all possibility of cavil, by giving the most precise and perspicuous definitions of those measures of forces, and all other quantities which he had occasion to consider, and by carefully adhering to them. And in one proposition of about 20 lines, viz. the 39th of the 1st book of the Principia, he explained every phenomenon adduced in support of the Leibnitzian doctrine, showing them to be immediate consequences of the action of a force measured by the velocity which it produces or extinguishes. There it appears that the heights to which bodies will rise in opposition to the uniform action of gravity are as the squares of the initial velocities: so are the depths to which they will penetrate uniformly resisting matter: so is the number of equal springs which they will bend to the same degree, &c. &c. &c. We have had frequent occasion to mention this proposition as the most extensively useful of all Newton's discoveries. It is this which gives the immediate application of mechanical principles to the explanation of natural phenomena. It is incessantly employed in every problem by the very persons who hold by the other measure of forces, although such conduct is virtually giving up that measure. They all adopt, in every investigation, the two theorems $ft=v$, and $fs=\frac{1}{2}v^2$; both of which suppose an accelerating force f proportional to the velocity v which it produces by its uniform action during the time t, and the theorem $\int fs=v^2$ is the 39th 1. Princip. and is the *conservatio virium vivarum*.

This famous dispute (the only one in the circle of mathematical science) has led us somewhat aside. But we have little more to remark with respect to measurable quantity. We cannot say what varieties of quantity are susceptible of strict measure, or that it is impossible to give accurate measures of every thing susceptible of augmentation and diminution. We affirm, however, with confidence, that pain, pleasure, joy, &c. are not made up of their own parts, which can be contemplated separately: but they may chance to be associated by nature with something that is measurable; and we may one day be able to assign their degrees with as much precision as we now ascertain the degrees of warmth by the expansion of the fluid in the thermometer. But we dare not descant farther upon these topics here. We beg once more to recommend to the particular notice of our mathematical readers, Dr. Reid's admirable essay above-mentioned, either in the 45th volume of the Philosophical Transactions, or in volume ix. p. 559—566, of the new abridgment of the Philosophical Transactions.

QUANTITY is popularly distinguished into *continued* and *discrete*.

QUANTITY, *continued*, or *continuous*, is when the parts are connected together, and is commonly called magnitude. This, again, is of two kinds; either successive, or improper, as time.

QUANTITY, *discrete*, is when the parts whereof it consists exist distinctly, and unconnected together; which makes what we call number or multitude.

QUANTITY *of matter* in any body, is the product of the density into the bulk; or a quantity arising from the joint consideration of its magnitude and density.

As, if a body be twice as dense, and take up twice as much space as another, it will be four times as great.

This quantity of matter is the best discoverable by the absolute weight of bodies. See MATTER.

QUANTITY *of motion*, the product of the mass into the velocity. See MOMENTUM and QUANTITY.

QUANTITY, in grammar, an affection of a syllable, whereby its measure, or the time wherein it is pronounced, is ascertained; or that which determines the syllable to be long or short.

Quantity is also the object of prosody, and distinguishes verse from prose; and the economy and arrangement of quantities, that is, the distribution of long and short syllables, makes what we call the number.

The quantities are used to be distinguished, among grammarians, by the characters ˘, short, as pĕr; and ¯, long, as rōs. There is also a common, variable, or dubious quantity; that is, syllables that are at one time taken for short ones, and at another time for long ones; as the first syllable in *Atlas*, *patres*, &c.

QUANTUM. *s.* (Latin.) The quantity; the amount (*Swift*).

QUANTUM MERUIT, called also an assumpsit, an action upon the case, grounded upon a necessity to pay a man for doing any thing so much as it deserves or merits.

QUANTUM VALEBAT, or an implied assumpsit, is where goods and wares sold are delivered by a tradesman at no certain price, or to be paid for them as much as they are worth in general; then *quantum valebat*, or an action on the case, lies, and the plaintiff is to aver them to be worth so much; so where the law obliges one to furnish another with goods or provisions, as an innkeeper his guests, &c.

QUARANTINE, is a trial which ships must undergo when suspected of a pestilential infection. It may be ordered by the king, with advice of the privy-council, at such times, and under such regulations, as he judges proper. Ships ordered on quarantine must repair to the place appointed, and must continue there during the time prescribed (generally six weeks); and must have no intercourse with the shore, except for necessary provisions, which are conveyed with every possible precaution. When the time is expired, and the goods opened and exposed to the air as directed, if there be no appearance of infection, they are admitted to port.

Ships infected with the pestilence must proceed to St. Helen's Pool, in the Scilly islands, and give notice of their situation to the custom-house officers, and wait till the king's pleasure be known.

Persons giving false information to avoid performing quarantine, or refusing to go to the place appointed, or escaping, also officers appointed to see quarantine performed, deserting their office, neglecting their duty, or giving a false certificate, suffer death as felons.

Goods from Turkey, or the Levant, may not be landed without licence from the king, or certificate that they have been landed and aired at some foreign port. See PLAGUE.

QUARE, in law, a term affixed to the title of several writs: as, 1. Quare ejecit infra terminum, is a writ that lies for a lessee cast out of his farm before his term is expired. 2. Quare impedit, a writ that lies for a person that has purchased an advowson, against him who disturbs him in the right thereof by presenting a clerk to it when the church is vacant. This writ differs from what is called a darrein presentment, because that is brought where a person or his ancestors formerly presented; but this lies for him that is purchaser himself. Yet in both these writs, the plaintiff recovers the presentation and damages; though the title to the advowson is recovered only by a quare impedit. 3. Quare incumbravit, is a writ that lies against a bishop, who, within six months after the vacancy of a benefice, confers it on his clerk, while two others are contesting the right of presentation. 4. Quare non admisit, is a writ that lies where any one has recovered an advowson or presentation, and sending his clerk to be admitted, the bishop refuses to admit him; in which case, the person that has the presentation may have this writ against the bishop. 5. Quare non permittit, is a writ that lies for one who has a right to present for a turn against the proprietary. 6. Quare obstruxit, is a writ that lies from him who, having a right to pass through another's grounds, cannot enjoy the same, because the owner has fenced them up.

QUARLES (Francis), the son of James Quarles, clerk to the board of green cloth, and purveyor to queen Elizabeth, was born in 1592. He was educated at Cambridge; became a member of Lincoln's Inn; and was for some time cup-bearer to the queen of Bohemia, and chronologer to the city of London. It was probably on the ruin of her affairs that he went to Ireland, as secretary to archbishop Usher; but the troubles in that kingdom forcing him to return, and not finding affairs more at peace in England, some disquiets he met with were thought to have hastened his death, which happened in 1644. His works both in prose and verse are numerous, and were formerly in great esteem, particularly his Divine Emblems: but the obsolete quaintness of his style has caused them to fall into neglect, excepting among particular classes of readers. "The memory of Quarles," says Mr. Headly, "has been branded with more than common abuse, and he seems to have been censured merely from the want of being read. If his poetry failed to gain him friends and readers, his piety should at least have secured him peace and good-will. He too often, no doubt, mistook the enthusiasm of devotion for the inspiration of fancy; to mix the waters of Jordan and Helicon in the same cup, was reserved for the hand of Milton; and for him, and him only, to find the bays of Mount Olivet equally verdant with those of Parnassus. Yet, as the effusions of a real poetical mind, however thwarted by untowardness of subject, will be seldom rendered totally abortive, we find in Quarles original imagery, striking sentiment, fertility of expression, and happy combinations; together with a compression of style that merits the observation of the writers of verse. Gross deficiencies of judgment, and the infelicity of his subjects, concurred in ruining him. Perhaps no circumstance whatever can give a more complete idea of Quarles's degradation than a late edition of his Emblems; the following passage is extracted from the preface: 'Mr. Francis Quarles, the author of the Emblems that go under his name, was a man of the most exemplary piety, and had a deep insight into the mysteries of our holy religion. But, for all that, the book itself is written in so old a language, that many parts of it are scarce intelligible in the present age; many of his phrases are so affected, that no person, who has any taste for reading, can peruse them with the least degree of pleasure; many of his expressions are harsh, and sometimes whole lines are included in a parenthesis, by which the mind of the reader is diverted from the principal object. His Latin mottoes under each cut can be of no service to an ordinary reader, because he cannot understand them. In order, therefore, to accommodate the public with an edition of Quarles's Emblems, properly modernised, this work was undertaken.' Such an exhibition

of Quarles is chaining Columbus to an oar, or making John Duke of Marlborough a train-band corporal."

QUA'RREL. *s.* (*querelle*, French.) 1. A breach of concord (*Hammond*). 2. A brawl; a petty fight; a scuffle (*Shakspeare*). 3. A dispute; a contest (*Hooker*). 4. A cause of debate (*Fairfax*). 5. Something that gives a right to mischief, reprisal, or action (*Bacon*). 6. Objection; ill-will (*Felton*). 7. Any one peevish or malicious (*Shakspeare*). 8. (*quadrella*, Italian). An arrow with a square head (*Camden*).

To QUA'RREL. *v. n.* (*querelle*, French.) 1. To debate; to scuffle; to squabble (*Shakspeare*). 2. To fall into variance (*Shakspeare*). 3. To fight; to combat (*Dryden*). 4. To find fault; to pick objections (*Bramhall*).

QUA'RRELLER. *s.* He who quarrels.

QUA'RRELOUS. *a.* (*querelleux*, French.) Petulant; easily provoked to enmity (*Shakspeare*).

QUA'RRELSOME. *a.* (from *quarrel.*) Inclined to brawls; easily irritated; irascible; choleric; petulant (*L'Estrange*).

QUA'RRELSOMELY. *ad.* In a quarrelsome manner; petulantly; cholericly.

QUA'RRELSOMENESS. *s.* (from *quarrelsome.*) Cholericness; petulance.

QUA'RRY. *s.* (*quarré*, Fr.) 1. A square (*Mortimer*). 2. (*quadreau*, French.) An arrow with a square head (*Sandys*). 3. Game flown at by a hawk (*Sandys*). 4. (*quarriere*, *quarrel*, Fr.) A stone mine; a place where they dig stones (*Cleaveland*).

To QUA'RRY. *v. n.* (from the noun.) To prey upon: not in use (*L'Estrange*).

QUA'RRYMAN. *s.* (*quarry* and *man.*) One who digs in a quarry (*Woodward*).

QUART. *s.* (*quart*, French.) 1. The fourth part; a quarter (*Spenser*). 2. The fourth part of a gallon (*Shakspeare*). 3. (*quarte*, French.) The vessel in which strong drink is commonly retailed (*Shakspeare*).

QUARTAN, or FOURTH DAY AGUE. Of this species of ague, as well as the other kinds, there are several varieties noticed by authors. The most frequent of these are, 1. The double quartan, with two paroxysms or fits on the first day, none on the second and third, and two again on the fourth day. 2. The double quartan, with a paroxysm on the first day, another on the second, but none on the third. 3. The triple quartan, with three paroxysms every fourth day. 4. The triple quartan, with a slight paroxysm every day, every fourth paroxysm being similar. See also FEBRIS INTERMITTENS, and NOSOLOGY.

QUARTA'TION. *s.* (from *quartus*, Lat.) A chymical operation (*Boyle*).

QUA'RTER. *s.* (*quart*, *quartier*, Fr.) 1. A fourth part (*Burnet*). 2. A region of the skies, as referred to the seaman's card (*Addison*). 3. A particular region of a town or country. 4. The place where soldiers are lodged or stationed (*Spectator*). 5. Proper station (*Milton*). 6. Remission of life; mercy granted by a conqueror (*Clarendon*). 7. Treatment shown by an enemy (*Collier*). 8. Friendship; amity: not in use (*Shakspeare*). 9. A measure of eight bushels (*Mortimer*). 10. False *quarter* is a cleft or chink in a *quarter* of a horse's hoof from top to bottom.

QUARTER, in heraldry, is applied to the parts or members of the first division of a coat that is quartered or divided into four quarters.

QUARTER OF A POINT, in navigation, is the fourth part of the distance between two cardinal points, which is 2° 48′.

QUARTER OF A SHIP, is that part of a ship's hold which lies between the steerage-room and the transom.

QUARTER-MASTERS, or QUARTEERS, in a ship of war, are officers whose business it is to rummage, stow, and trim, the ship in the hold; to overlook the steward in his delivery of victuals to the cook, and in pumping or drawing out beer, or the like. They are also to keep their watch duly, in conning the ship, or any other duty.

QUARTER-CAST. A horse is said to cast his quarters, when, for any disorder in his coffin, we are obliged to cut one of the quarters off the hoof; and when the hoof is thus cut, it grows and comes on anew.

QUARTER (False), in farriery. See FALSE QUARTER.

To QUA'RTER. *v. a.* (from the noun.) 1. To divide into four parts (*Shakspeare*). 2. To divide; to break by force (*Shakspeare*). 3. To divide into distinct regions (*Dryden*). 4. To station or lodge soldiers (*Dryden*). 5. To lodge; to fix in a temporary dwelling. 6. To diet (*Hudibras*). 7. To bear as an appendage to the hereditary arms (*Peacham*).

QUA'RTERAGE. *s.* (from *quarter*) A quarterly allowance (*Hudibras*).

QUA'RTERDAY. *s.* (*quarter* and *day.*) One of the four days in the year, on which rent or interest is paid (*Addison*).

QUA'RTERDECK. *s.* (*quarter* and *deck.*) The short upper deck.

QUARTERING, in gunnery, is when a piece of ordnance is so traversed that it will shoot on the same line, or on the same point of the compass, as the ship's quarter bears.

QUARTERING, in heraldry, is dividing a coat into four or more quarters, or quarterings, by parting, couping, &c. that is, by perpendicular and horizontal lines, &c.

QUA'RTERLY. *a.* (from *quarter.*) Containing a fourth part (*Holder*).

QUA'RTERLY. *ad.* Once in a quarter of a year.

QUA'RTERN. *s.* A gill, or the fourth part of a pint.

QUARTER SESSIONS. The sessions of the peace is a court of record holden before two or more justices, whereof one is of the quorum, for the execution of the authority given them by the commission of the peace, and certain statutes and acts of parliament. The jus-

tices keep their sessions in every quarter of the year at least, and for three days if need be; to wit, in the first week after the feast of St. Michael, in the first week after the Epiphany, in the first week after Easter, and in the first week after St. Thomas, and oftener if need be.

Any two justices, one whereof is of the quorum, by the words of the commission of the peace, may issue their precept to the sheriff, to summon a session for the general execution of their authority; and such session, holden at any time within that quarter of a year, is a general quarter-session, and the sheriff must summons a jury under their authority.

There are many offences, which, by particular statutes, belong properly to this jurisdiction, and ought to be prosecuted in this court, as the smaller misdemeanors, not amounting to felony, and especially offences relating to the game, highways, alehouses, bastard children, the settlements and provision of the poor, vagrants, servants' wages, apprentices, and popish recusants. Some of these are proceeded upon by indictment, and others in a summary way, by motion and order, which may, for the most part, unless guarded against by any particular statute, be removed into the Court of King's Bench, by certiorari, and be there either quashed or confirmed.

The business done at quarter-sessions is become of the highest importance to the country, and the public are greatly indebted to those magistrates who have sufficient knowledge of law to perform the duties of their office and give their attendance. In Ireland a practising barrister is appointed at each session to assist as chairman. In England this is not generally the case by law, but barristers are chiefly preferred, and the duty to be performed is so multifarious, that it requires no small skill in law, accompanied with much activity and industry, to execute it justly.

QUARTERS, a name given at sea to the several stations where the officers and crew of a ship of war are posted in action.

The number of men appointed to manage the artillery is always in proportion to the nature of the guns, and the number and condition of the ship's crew. They are, in general, as follow, when the ship is well manned, so as to fight both sides at once occasionally:

Pounder	No. of men.
To a 42	15
32	13
24	11
18	9
12	7
9	6
6	5
4	4
3	3

This number, to which is often added a boy to bring powder to every gun, may be occasionally reduced, and the guns nevertheless well managed. The number of men appointed to the small arms on board his majesty's ships and sloops of war, by order of the admiralty, are:

Rate of the ship.	No. of men to the small arms.
1st	150
2d	120
3d of 80 guns	100
— of 70 guns	80
4th of 60 guns	70
4th	60
5th	50
6th	40
Sloops of war	30

The lieutenants are usually stationed to command the different batteries, and direct their efforts against the enemy. The master superintends the movements of the ship, and whatever relates to the sails. The boatswain, and a sufficient number of men, are stationed to repair the damaged rigging; and the gunner and carpenter, wherever necessary, according to their respective offices.

QUARTERS (Close), in a ship, those places where the seamen quarter themselves, in case of boarding, for their own defence, and for clearing the decks, &c.

QUARTERS OF A SADDLE; the pieces of leather made fast to the lower part of the sides of the saddle, and hanging down below the saddle.

QUARTERS, i. e. the fore-quarters and hind-quarters of a horse. The fore-quarters are the shoulders and the fore legs: the hind-quarters are the hips and the legs behind.

QUARTERS OF A HORSE'S FOOT; the sides of the coffin comprehended between the toe and the heel on one side and the other of the foot. The inner-quarters are those opposite to one another, facing from one foot to the other; these are always weaker than the outside quarters, which lie on the external sides of the coffin. A horse is said to have a false quarter when the hoof has a kind of cleft occasioned by a horse's casting his quarter, and getting a new one, for then the horn becomes uneven and also softer than the rest of the hoof; and the foot should be shod with some nicety. But if the cleft be considerable, and take up a fourth of the hoof, the horse is worth little.

QUA'RTERSTAFF. *s.* A staff of defence (*Dryden*).

QUA'RTILE. *s.* An aspect of the planets, when they are three signs or ninety degrees distant from each other (*Harris*).

QUA'RTO. *s.* (*quartus*, Latin) A book in which every sheet, being twice doubled, makes four leaves (*Watts*).

QUARTZUM. Quartz. In mineralogy, a genus of the class earths; order siliceous. Consisting of silica, about six per cent of alumina, and one per cent of carbonat of lime; hard, lightish, brittle, shining internally, breaking into indeterminate fragments with acute margins, more commonly parisitical, found in mountains of all ages, mouldering in the air;

not melting by fire alone, but with soda running into a hard pellucid glass. Twenty-four species.

1. Q. fibrosum. Fibrous quartz. Diaphonous, whitish, fibrous, with the fibres thicker and parallel, of a common form. Found on the Carpathian mountains in Hungary, and near Rabischau in Silesia: exceedingly rare.

2. Q. foveolatum. With the surface uneven by shallow pits of a common form. Found in Hungary, Bohemia, near Freyburg and Schneeburg in Saxony, and in the quarries of Sweden; colour generally whitish, rarely violet, or ochraceous; mostly diaphonous, though sometimes opake; the pits or hollow very numerous and cubic, rarely parallellopiped or triedo-pyramidal, or spherical or tubular.

3. Q. foraminulentum. Perforated with deep, roundish hollows, of a common form. Found near Freyburg in Saxony, and near Schemnitz in Hungary; colour white, greyish or ochraceous; the hollows generally narrow, and sometimes flexuous.

4. Q. erosum. Full of numerous, very minute empty hollows and cavities, of a common form. Found in the mines of Hungary; white, violet, or dull greenish.

5. Q. cellosum. Cellular quartz. Lamellar, with the plates contiguous, placed at various angles with each other and forming cells, of a common form. The cells vary in a great multitude of ways, triangular, polygonal, gyrating, or double. Found in Siberia, Hungary, Bohemia, Saxony. Colour sometimes white, sometimes more or less tinged with oxyd of iron.

6. Q. lamellosum. Lamellar or lamellated quartz. Lamellar, with the plates parallel, of a common form. Found near Schemnitz in Hungary, and in the mines of Bohemia; colour milk-white, white, violet, or brown; rarely yellow and blue: the foliations sometimes very thin and compacted together.

7. Q. cristatum. The surface marked with very fine parallel groves, of a common form. Saxony and Hungary; white, violet, or yellowish-brown.

8. Q. globulozum. Of a more or less rounded form, pellucid: perfectly globular, oval, almond-shaped, kidney-shaped, tuberous. Found detached in the beds or banks of rivers in various parts of Europe, Asia, and Africa; or compacted with other fossils in Hungary, Saxony, &c.—colour generally white.

9. Q. cylindricum. Separating into cylindrical pieces; the cylinders sometimes parallel, sometimes diverging. Found in Hungary, Saxony, and in other parts of the continent; colour white, subopake, with the cylinders thinner or thicker.

10. Q. granulare. Granular quartz. Quartz in grains. Separating into granular fragments. Found commonly in small grains, sometimes detached, sometimes compacted, in Norway, Spain, France, and Saxony; white, variegated, greenish, red, or yellow-brown; the grains sometimes so disposed as to reflect a fine splendour when polished.

11. Q. stillatitium. Stalactitic quartz. Gradually deposited by water impregnated with particles of quartz, and often covering other bodies as with a bark. Bishopric of Cologne, Ireland, Sweden, and Hungary; colour diaphonous, generally white, sometimes yellowish or reddish; and appearing in the form of solid or hollow cones, or in that of roses, cauliflowers, grapes, &c.

12. Q. fragile. Pure quartz. Solid quartz. Of a common form and splintery texture, not falling spontaneously into fragments: in some instances nearly opake, in others diaphonous, milky white. Found almost every where in the fissures of rocks and mountains; sometimes opake, sometimes diaphonous, rarely semipellucid; colour mostly white, oftentimes milky, frequently pale greenish or red.

13. Q. Prasius. Prase. Pellucid agate. Smaragdmatt, Cronst. Leek-green, diaphonous, of a coarse splintery texture. Found in Saxony, in Finland, Siberia, and Bohemia, in irregular masses, or variously crystallized; colour green of various degrees of density, sometimes yellowish or blueish-green; when broken shining, and of a coarse shivery texture, sometimes approaching to the imperfectly small conchoidal; admits a degree of polish, and is frequently numbered among the gems.

14. Q. pingue. Common quartz. Pure quartz. Of a common form, slightly greasy to the touch, approaching to the minutely conchoidal texture, not falling spontaneously into fragments. Pellucid, diaphonous, or coloured. Found distributed in most parts of the globe, frequently in the native oxyds of metals and minerals, sometimes forming whole rocks and sometimes in beds and veins; of various degrees of transparency and colour, but generally white or greyish: spec. grav. from 26,4 to 26,5.

15. Q. tabulare. Of a conchoidal texture, in tabular crystals. Hungary and Saxony: colour generally white, rarely dull-greenish; the tables mostly rhombic, though sometimes three-sided.

16. Q. cubicum. Of a conchoidal texture, in cubic crystals which are frequently hollow within. Faces square or rhombic. Sweden, Hungary, Saxony, Bohemia; generally in aggregate crystals, which seem to have acquired their form from some other crystal which it had enveloped and which had gradually mouldered, leaving a hollow in its place; white, hoary, margaritaceous, or brown-red; pellucid, diaphanous, or nearly opake.

17. Q. octahedricum. Of a conchoidal texture, in a double four-sided pyramid. Found in Saxony; often hollow within: colour the same as quartzum cubicum.

18. Q. triedrum. Of a conchoidal texture, in a simple three-sided pyramid. Found in Sweden and Saxony, in aggregate crystals, which are sometimes hollow; lustre frequently pellucid; colour reddish or white.

19. Q. pyramidale. Of a conchoidal texture, in a single six-sided pyramid transversely striate; the pyramid truncate at top, perfect, or doubled at top or bottom. Found in various parts of England and Scotland, in Switzerland, Hungary, Silesia, Bohemia, and Saxony; more commonly pellucid than opake; colour mostly white, sometimes pale red, yellowish, or yellowish-red; the crystals generally in grains, sometimes resembling a kidney or a gem.

20. Q. Pseudadomas. Of a conchoidal texture, in a double six-sided pyramid, not striate; the pyramid perfect; the margins of the common base truncate, pellucid or opake. Found near Bristol and Buxton, in Cornwall, Derbyshire, and Northampton, and various parts of Europe; colour mostly white, sometimes reddish, or blackish; rarely hollow within; the crystals sometimes detached, sometimes clustered and adhering together in various forms.

21. Q. Crystallus. Rock crystal. Mountain crystal. White, pellucid, of a conchoidal texture, in a six-sided transversely striate prism, the prism varying almost to infinity in different varieties. Found in almost every part of the globe, particularly in alpine situations, and is almost exclusively confined to primitive rocks, especially granite and mica slate; colour various shades of white, brown, red, and yellow, sometimes mixed together; fragments indeterminately angular with very sharp edges; does not lose its transparency in the fire; causes double refraction: spec. gravity from 2,650, to 2,888, contains

Silica - -	93,0
Alumina -	6,0
Lime - -	1,0
	100

Bergman.

22. Q. Pseudogemma. Nitrous fluor. Mountain crystal. Coloured, pellucid, of a conchoidal texture, in a six-sided transversely striate prism: the colour varying in different varieties, blackish, clove-brown, red, fulvous, yellow, leek-green, grass-green, sky-blue, deep-blue. Found chiefly in veins abounding in rock crystal, of various degrees of magnitude and transparency: often sold for gems, but may easily be distinguished by the different form of their crystals, and by their less degree of hardness and lustre: they yield to the file, and like the rock-crystal, when two pieces are rubbed hard together, they emit a phosphorescent light in the dark, and exhale a peculiar empyreumatic odour.

23. Q. Amethystus. Amethyst. Violet-crystal. Violet-blue, varying in texture, form, and degrees of transparency. Found in Mexico, Ceylon, Sweden, Bohemia, Saxony, and other parts of Europe, in veins of primitive rocks, and sometimes in agate balls and kidneys in porphyry; usually violet-blue in various degrees of intensity, sometimes greenish, rarely white; texture conchoidal, fibrous, granular, or splintery; lustre various degrees of transparency to nearly opake; crystals simple six-sided pyramids, or with faces of different sizes the planes of which are smooth; yields to the file, is brittle, and easily frangible; specific gravity 2,750: contains

Silica - -	97,50
Alumina -	0,25
Oxyd of iron with a trace of manganese	0,50
Loss - -	1,75
	100

24. Q. Pseudocrystallus. Rude quartz. Opake, in a six-sided prism terminating at one or both ends in a six-sided pyramid. Found in Hungary, Bohemia, Saxony, Sweden, and Barbary: the crystals sometimes detached, sometimes united; colour, various degrees of white, black, red or variegated.

The size of the crystal varies from small to very large; some of the largest prisms are more than two feet in length, and weigh above 100 pounds. The planes of the prisms are transversely striated, but those of the terminating pyramids are smooth. The crystals are commonly brightly shining, both externally and internally, with a vitreous lustre. Its fracture is conchoidal, passing occasionally into obscurely foliated. The fragments are interminatedly angular, and very sharp-edged. The colourless or slightly coloured varieties are usually transparent, but those that are much loaded with iron-ochre are often only transfluent: when transparent it exhibits a double reflection. Its hardness is superior to that of glass, and it gives vivid sparks when struck against a steel. It is brittle and easily frangible. When two crystals are rubbed together they afford a phosphorescent light, and exhale a peculiar odour. By exposure to the blowpipe this mineral undergoes no change, except that certain of its varieties lose their colour. Even a blow-pipe charged with oxygen gass is wholly incapable, according to Lavoisier, of inducing the least sign of fusion. According to Ehrmann, however, it melts into an enamel; but in this case the quartz was probably heated on charcoal, from which it might acquire potash enough to serve as a flux. Several of the varieties of crystallized quartz are used to seal stones and ornaments of various kinds on account of their hardness, the exquisite polish that they are capable of receiving, and the pleasing tone of their colours.

The most perfectly transparent and colourless is called by the lapidaries rock crystal, and besides being applied to various purposes of ornament, it is cut into spectacle glasses, which from the hardness are not so liable to be scratched as those which are made of flint glass. The reddish-purple or violet-coloured variety is called amethyst, and is occasionally ranked among the gems: it must not however be confounded with the oriental amethyst, which is a true gem, being a variety of corundum. The pearl-gray or pale-blue variety is called false, or

water sapphire. The yellow and smoke-coloured varieties are called false topaz. The green varieties are not unfrequently mistaken for chrysolite.

The largest and most esteemed crystals of quartz come from Madagascar, also from the Alps, from Norway, and Scotland, where they occur lining cavities in granite. Amethyst is commonly found in geodes of agate, and is chiefly procured from Catalonia in Spain, from Bohemia, Saxony, Silesia, and the Palatinate in Germany; from Hungary; from Auvergne in France, and the Uralian mountains near Catharinenburg in Russia. Quartz crystals also occur in most metallic veins both of ancient and recent formation in every kind of rock. There is scarcely any crystallized mineral so liable as quartz to contain foreign substances; sometimes drops of water and bubbles of air may be observed in it, also fibres of amethyst, capillary crystals, of schorl and ruthil, scales of chlorite, and dendritical iron ore, &c.

To QUA'SH. *v. a.* (*quassen*, Dutch.) 1. To crush; to squeeze (*Waller*). 2. To subdue suddenly (*Roscommon*). 3. To annul; to nullify; to make void.

To QUA'SH. *v. n.* To be shaken with a noise.

QUASH. *s.* A pompion (*Ainsworth*).

QUASSIA. (from a slave of the name of Quassi, who first used it with uncommon success in the malignant endemic fevers which frequently prevail at Surinam.) Quassia. In botany, a genus of the class decandria monogynia. Calyx five-leaved; petals five; nectary five-leaved; drupes five, distinct, two-valved, one-seeded, inserted on a fleshy receptacle. Three species.

1. Q. simarouba. Simirouba. A high and bulky tree, common to the woodlands of Jamaica; the trunk of the old trees black and a little furrowed; the bark of the young smooth and grey, interspersed with yellow spots; inner bark white, fibrous, tough, with a slightly bitter taste: branches alternate, spreading; flowers monœcous, panicled, of a beautiful yellow; leaves abruptly pinnate; leaflets alternate, slightly petioled; petiole naked.

The simarouba of the shops is the bark of the branches, for the medical properties of which see SIMAROUBA.

2. Q. amara. Bitter quassia. A tree less tall than the preceding, branchy; wood of a white colour and light; bark thin and grey; leaves unevenly pinnate, entire, elliptic, glabrous; leaflets opposite, sessile; petiole jointed, winged; flowers racemed, hermaphrodite, of a bright red colour. A native of Surinam, and of South America generally.

The root, bark, and wood of this tree are all comprehended in the catalogues of the Materia Medica. Its botanical character was known long before that of the simarouba, as it is noticed in its proper place in the Sp. Plantarum, upon the authority of Dahlberg, when it was thought peculiar to Surinam. Afterwards, Linnéus, in his Materia Medica, referred it to the Nux Americana, foliis alatis bifidis of Commelin.

The roots are perfectly ligneous; they may be medically considered in the same light as the wood, which is now most generally employed, and seems to differ from the bark in being less intensely bitter; the latter is therefore thought to be a more powerful medicine. Quassia has no sensible odour; its taste is that of a pure bitter, more intense and durable than that of almost any other known substance; it imparts its virtues more completely to watery than to spirituous menstrua, and its infusions are not blackened by the addition of martial vitriol. The watery extract is from a sixth to a ninth of the weight of the wood, the spirituous about a twenty-fourth. Quassia, as before observed, derived its name from a negro named Quassi, who employed it with uncommon success as a secret remedy in the malignant endemic fevers which frequently prevailed at Surinam. In consequence of a valuable consideration, this secret was disclosed to Daniel Rolander, a Swede, who brought specimens of the quassia wood to Stockholm, in the year 1756; and, since then, the effects of this drug have been generally tried in Europe, and numerous testimonies of its efficacy published by many respectable authors. Various experiments with quassia have likewise been made, with a view to acertain its antiseptic powers; from which it appears to have considerable influence in retarding the tendency to putrefaction; and this, Professor Murray thinks, cannot be attributed to its sensible qualities, as it possesses no adstringency whatever; nor can it depend upon its bitterness, as gentian is much bitterer, yet less antiseptic. The medicinal virtues ascribed to quassia are those of a tonic, stomachic, antiseptic, and febrifuge. It has been found very effectual in restoring digestion, expelling flatulencies, and removing habitual costiveness, produced from debility of the intestines, and common to a sedentary life. Dr. Lettsom, whose extensive practice gave him an opportunity of trying the effects of quassia in a great number of cases, says "In debility, succeeding febrile diseases, the Peruvian bark is most generally more tonic and salutary than any other vegetable hitherto known; but in hysterical atony, to which the female sex is so prone, the quassia affords more vigour and relief to the system than the other, especially when united with the vitriolum album, and still more with the acid of some absorbent." In dyspepsy arising from hard drinkings, and also in diarrhæas, the doctor has exhibited the quassia with great success. But, with respect to the tonic and febrifuge qualities of quassia, he says, "I by no means subscribe to the Linnéan opinion, where the author declares *ne quidem judice chinchinam longe superat.*" It is very well known, that there are certain peculiarities of the air, and idiosyncrasies of constitution, unfavourable to the exhibition of Peruvian bark, even in the most clear intermissions of fever; and writers have repeatedly noticed it. But this is comparatively very rare. About midsummer 1785, Dr. L. met with several instances of low remittent and nervous fevers,

wherein the bark uniformly aggravated the symptoms, though given in intermissions the most favourable to its success, and wherein quassia, or snake-root, was successfully substituted. In such cases, he mostly observed, that there was great congestion in the hepatic system, and the debility at the same time discouraged copious evacuations. And in many fevers, without evident remissions to warrant the use of the bark, whilst, at the time, increasing debility began to threaten the life of the patient, the Doctor found that quassia, or snake-root, singly or combined, upheld the vital powers, and promoted a critical intermission of fever, by which an opportunity was offered for the bark to effect a cure. It may be given in infusion, or in pills made from the watery extract; the former is generally preferred, in the proportion of three or four drachms of the wood to twelve ounces of water.

3. Q. excelsa, or polygama. Common to the woods of Jamaica; beautiful, tall and stately; a hundred feet high, ten feet in circumference three yards from the ground: trunk straight, smooth, tapering; branches ascending; outside bark smoothish, light grey or ash-colour, from various lichens; bark of the root yellowish; wood yellow, tough, hardish, takes a good polish; leaves unevenly pinnate; leaflets opposite, petioled; petiole naked; flowers polygamous, panicled, small, yellow-green, with a minute calyx; fruit a smooth black drupe, round-shaped, size of a pea.

In taste and medical virtue nearly resembling the last; and very largely employed in Jamaica for the same purposes.

QUA'TERCOUSINS. *s.* Those within the first four degrees of kindred; friends (*Skinner*).

QUATE'RNARY. *s.* (*quaternarius*, Lat.) The number four (*Boyle*).

QUATERNATE LEAVES, in botany. Four-fold leaves. Growing by fours, or coming out four together; as in the stellatæ.

QUATE'RNION. *s.* (*quaternio*, Lat.) The number four (*Holder*).

QUATE'RNITY. *s.* (*quaternus*, Latin.) The number four (*Brown*).

QUA'TRAIN. *s.* (*quatrain*, Fr.) A stanza of four lines rhyming alternately (*Dryden*).

QUATUORVIR, in antiquity, formerly written IIII. VIR, a Roman magistrate, who had three colleagues joined with him in the same administration, and had the care of conducting and settling the colonies sent into the provinces. There were also quatuorviri appointed to inspect and take care of repairs, &c.

QUAVER, in music, a note or measure of time, equal to half a crotchet, or to an eighth part of a semibreve. See MUSIC.

To QUA'VER. *v. n.* (cpean, Sax.) 1. To shake the voice; to speak or sing with a tremulous voice (*Bacon*). 2. To tremble; to vibrate (*Newton*)

QUAY. *s.* (*quai*, Fr.) A key; an artificial bank to the sea or river, on which goods are conveniently unladen.

QUE'ACHY. *a.* Unsolid; unsound; boggy; not in use (*Drayton*).

QUEAN. *s.* (cpean, Saxon.) A worthless woman; generally a strumpet (*Dryden*).

QUE'ASINESS. *s.* (from *queasy*.) The sickness of a nauseated stomach.

QUE'ASY. *a.* (of uncertain etymology.) 1. Sick with nausea (*Donne*). 2. Fastidious; squeamish (*Dryden*). 3. Causing nauseousness (*Shakspeare*).

QUEBEC, a city and the capital of Lower Canada, situate on the N.W. shore of the river St. Lawrence. It is divided into the upper and lower town; the former erected on the summit of a limestone rock, and the latter round the base of the eminence, on the border of the river. The houses in each are of stone, and the fortifications strong, though not regular. The governor resides in a citadel, which covers the town, and is both regular and handsome. The cathedral of the catholics is a plain building, with the spire on one side of its front. The jesuits college, a large edifice, is now converted into a barrack for the troops. The protestant metropolitan church, and a house for the courts of law, are neat edifices built on the site of a monastery destroyed by fire in 1796. The seminary of the catholics and the convent of the Ursulines are spacious buildings, with extensive gardens. On the N. side of the town is an edifice above 500 feet in length, containing the office of ordnance, an armoury, storehouses and workshops, and a public gaol. The river St. Lawrence here narrows suddenly to the breadth of a mile; but hence to the sea it is from four to five leagues broad, and navigable for large men of war. The harbour is safe and commodious, and flanked by two bastions, that are raised 25 feet from the ground, which is the height of the tides at the time of the equinox. This city was erected by the French in 1605. The English reduced it, with all Canada, in 1626; but it was restored in 1632. In 1759, it was again taken by the English, after a battle memorable for the death of general Wolfe, in the moment of victory, and confirmed to them by the peace of 1763. It is 400 miles by the river, from the Atlantic Ocean, and 590 N.W. of Boston. Lon. 69. 48 W. Lat. 46. 55 N. The inhabitants are now computed at more than 15,000.

To QUECK. *v. n.* To shrink; to show pain.

QUEDA, a kingdom in the peninsula of Malacca, tributary to Siam. The principal town, of the same name, is subject to the Dutch. It has a harbour, and is 300 miles N. of the city of Malacca. Lon. 100. 5 E. Lat. 7. 5 N.

QUEDLINGBURG, a town of Upper Saxony, in the principality of Anhalt, with a famous protestant abbey, the abbess of which is a princess of the empire. The inhabitants of the town subsist by brewing, husbandry, and feeding of cattle. It is 10 miles S.E. of Halberstadt. Lon. 11. 34 E. Lat. 52. 1 N.

QUEEN. (*regina*.) A woman who holds the

crown of a realm, singly, and by right of blood.

The word queen is derived from the Saxon *cwen*, *uxor*, the wife of any one, but applied, by way of excellency, to the wife of the king only; whence she was anciently called the king's queen; the West Saxons having no other name for a queen but the king's wife. Asser de Ælfred. rebus, &c. She was also called lady, in Saxon *wlæfdig*; just as *madame*, or *mademoiselle*, are still used in France, for the wife and daughter of the duke of Orleans.

The name queen is also given, by way of courtesy, to her that is married to the king; called, by way of distinction, queen consort. In respect whereof the former is called queen regnant, or regent.

The widow of a king is also called queen, but with the addition of dowager.

In the first sense, queen is, in all construction, the same with king; and has the same power and prerogative, in all respects, that the king has.

The queen consort is inferior, and a person distinct from, and a subject of, the king. In England, though she be a feme covert, yet may she sue, and be sued, in her own name; and may make leases, and grants, &c. as a feme sole.

She has several other prerogatives. Though an alien, she may purchase lands in fee-simple, without either naturalization, or denization; she may present to a benefice; nor is plenarty a bar against her more than against the king. She is also capable of taking a grant from the king, which no other wife can do from her husband; and she may have a separate property in goods as well as lands, and has a right to dispose of them by will. She pays no toll, and shall not be amerced, if she be non-suited in any action; and may not be impleaded till first petitioned.

To conspire her death, or violate her chastity, is high treason. She has an ancient peculiar revenue, called queen-gold; besides a very large dower, with a royal court, and officers, apart.

The queen dowager, as the widow of the king, enjoys most of the privileges belonging to her as queen consort. But it is not high treason to conspire her death, or to violate her chastity; because the succession to the crown is not thereby endangered.

To QUEEN. *v. n.* To play the queen.

QUEEN OF THE MEADOWS, in botany. See SPIRÆA.

QUEEN'S BALM, in botany. See DRACOCEPHALUM.

QUEEN'S GILLIFLOWER, in botany. See HESPERIS.

QUEEN MARGARET, in botany. See ASTER.

QUEEN'S VIOLET, in botany. See HESPERIS.

QUEEN-STOCK GILLIFLOWER, in botany. See CHEIRANTHUS.

QUEEN CHARLOTTE'S CAPE, a promontory of the island of Southern Georgia. Lon. 36. 11 W. Lat. 54. 32 S.

QUEEN CHARLOTTE'S FORELAND, a cape of the island of New Caledonia. Lon. 167. 12 E. Lat. 22. 15 S.

QUEEN CHARLOTTE'S ISLAND, an island in the S. Pacific Ocean, six miles long and one broad, discovered by captain Wallis in 1767. Lon. 138. 4 W. Lat. 19. 18 S.

QUEEN CHARLOTTE'S SOUND, a sound at the N. extremity of the S. island of New Zealand, near Cook's Strait. The country here is not so steep as at Dusky Bay, and the hills near the seaside are in general of an inferior height, but covered with forests equally intricate and impenetrable. The dogs here are of the long-haired sort, with pricked ears, and much resemble the common shepherd's cur, but they are very stupid. Lon. 174. 13 E. Lat. 41. 5 S.

QUEEN'S COUNTY, a shire of Ireland, in the province of Leinster, 30 miles long and 29 broad; bounded on the N. by King's County, on the E. by Kildare, on the S.E. by Catherlough, on the S. by Kilkenny, and on the W. by King's County and Tipperary. It was formerly full of woods and bogs; but is now much improved. It contains 50 parishes, and sends eight members to parliament. Maryborough is the capital.

QUEEN'S FERRY, a borough in Linlithgowshire, seated on the frith of Forth, where it is not more than two miles wide. It is a much frequented ferry, and is nine miles W. of Edinburgh. Lon. 3. 20 W. Lat. 56. 0 N.

QUEENBOROUGH, a borough in Kent, in the isle of Shepey, with a market on Monday and Thursday. It had once a strong castle, the remains of which are still to be seen The chief employment of the inhabitants is oyster-dredging, oysters being here in great plenty, and of a fine flavour. It is 15 miles N.W. of Canterbury, and 45 E. of London. Lon. 0. 48 E. Lat. 51. 26 N.

QUEER. *a.* Odd; strange; original; particular (*Spectator*).

QUEE'RLY. *ad.* Particularly; oddly.

QUEE'RNESS. *s.* (from *queer*.) Oddness; particularity.

QUEEST, a ringdove. See COLUMBA.

QUEICH, a river of Germany, which passes by Landau, and runs into the Rhine, near Germersheim.

QUEI-LING, a city of China, capital of the province of Quang-si. It has its name from a flower called quei, which grows on a tree resembling a laurel, and emits such a sweet odour, that it perfumes the whole country. It stands on a river that runs into the Ta, but with such rapidity as not to be navigable. It is 180 miles N. by W. of Canton, and 587 S. of Peking. Lon. 109. 51 E. Lat. 25. 12 N.

To QUELL. *v. a.* (cpellan, Saxon.) To crush; to subdue: originally, to kill (*Atterbury*).

To QUELL. *v. n.* To die (*Spenser*).

QUELL. *s.* Murder: not in use (*Shakspeare*).

QUE'LLER. *s.* (from *quell.*) One that crushes or subdues (*Milton*).

QUELLINUS (Erasmus), an eminent painter, born at Antwerp in 1607. He was the disciple of Rubens. Several of the churches in his native city are ornamented with the united skill of master and pupil. He died in 1678.

QUELLINUS (John Erasmus) the son and disciple of the above, was born at Antwerp, in 1630. After studying under his father he went to Rome, and then returned to Antwerp, where he was employed in decorating the churches. He died in 1715.

QUE'LQUECHOSE. *s.* (Fr.) A trifle; a kickshaw (*Donne*).

To QUEME. *v. n.* (cpeman, Saxon.) To please.

To QUENCH. *v. a.* 1. To extinguish fire (*Sidney*). 2. To still any passion or commotion (*Shakspeare*). 3. To allay thirst (*South*). 4. To destroy (*Davies*).

To QUENCH. *v. n.* To cool; to grow cool (*Shakspeare*).

QUE'NCHABLE. *a.* (from *quench.*) That may be quenched.

QUE'NCHER. *s.* (from *quench.*) Extinguisher.

QUE'NCHLESS. *a.* (from *quench.*) Unextinguishable (*Crashaw*)

QUENSTEDT (John Andrew), a Lutheran divine, born at Quedlimburgh in 1617. He wrote a work, styled Dialogus de Patriis illustrorum virorum, doctrina et scriptis, comprising the learned men from Adam, to 1600. He died in 1688.

QUENTIN (St.), a strong town of France, in the department of Aisne, with a considerable manufacture of lawns and cambrics. Near this place, in 1557, Philip II. of Spain gained a signal victory over the French, and afterward took the town by storm. In memory of this, he built the Escurial. The town was restored to France in 1559. It is seated on an eminence, on the river Somme, 21 miles S. of Cambray, and 83 N. by E. of Paris. Lon. 3. 29 E. Lat. 49. 50 N.

QUERCI, or QUERCY, a late province of France, bounded on the N. by Limosin, E. by Rouergue and Auvergne, S. by Languedoc, and W. by Perigord. It is fertile in corn, wine, and fruits. It now forms the department of Lot.

QUERCUS. Oak. In botany, a genus of the class monœcia, order polyandria. Male: calyx campanulate, lobed; corolless; stamens from five to ten. Female: calyx campanulate, very entire, rough; corolless; styles from two to five; stigmas three; nut superior, coriaceous, one-seeded. Twenty-seven species scattered over the globe, of which two are indigenous to our own country. The following are cultivated.

1. Q. robur. Common oak. Well known to every man; and proverbially to every Englishman. In woods rises to a very considerable height, but when planted singly is rather a spreading than a lofty tree, sending off horizontally prodigious branches, which considerably divide and subdivide. Trunk covered with a very rugged brown bark; leaves deciduous oblong, broader towards the top, with rather acute sinuses, and obtuse angles; peduncles of the fruit elongated.

There are several varieties from a variation in the leaf, form of the tree, or duration of the foliage.

The English oak is as remarkable for its slowness of growth, and longevity, as for its bulk; the trunk has been often observed to have attained not more than twenty inches, and sometimes not more than fourteen, in the space of fourscore years. In regard to bulk we have an account of an oak belonging to lord Powis, growing in Broomfield wood, near Ludlow in Shropshire, in 1764, the trunk of which measured 68 feet in girth, 23 in length; and which, reckoning 90 feet for the larger branches, contained in the whole 1455 feet of timber, round measure, or 29 load and 5 feet, at 50 feet to a load. The Cowthorp oak, near Wetherby in Yorkshire, lays a claim to being the father of the forest. Dr. Hunter, who, in his edition of Evelyn, has given an engraving of it, says, that within three feet of the surface it measures sixteen yards, and close to the ground twenty-six. In 1776, though in a ruinous condition, it was 85 feet high, and its principal limb extended 16 yards from the bole. The foliage was very thin. If this measurement was taken as the dimensions of the real stem, the size of this tree would be enormous; but like most very large trees, its stem is short, spreading wide at the base, the roots rising above the ground like buttresses to the trunk, which is similar not to a cylinder but to the frustum of a cone. Mr. Marsham says, "I found it in 1768, at four feet, 40 feet 6 inches; at five feet, 36 feet 6 inches; and at six feet, 32 feet 1 inch." In the principal dimensions then, the size of the stem, it is exceeded by the Bentley oak, of which the same writer gives the following account: "In 1759 the oak in Holt forest, near Bentley, was at seven feet, 34 feet. There is a large excrescence at five and six feet that would render the measure unfair. In 1778 this tree was increased half an inch in 10 years. It does not appear to be hollow, but by the trifling increase I conclude it not sound." These dimensions, however, are exceeded by those of the Boddington oak. It grows in a piece of rich grass land, called the old orchard ground, belonging to Boddington manor farm, lying near the turnpike road between Cheltenham and Tewksbury, in the vale of Gloucester. The stem is remarkably collected at the root, the sides of its trunk being much more upright than those of large trees in general; and yet its circumference at the ground is about 20 paces; measuring with a two foot rule, it is

more than 18 yards. At three feet high it is 42 feet, and where smallest, i. e. from five to six feet high, it is 36 feet. At six feet it swells out larger, and forms an enormous head, which has been furnished with huge, and probably extensive, arms. But time and the fury of the wind have robbed it of much of its grandeur, and the greatest extent of arm in 1783 was eight yards from the stem.

In the Gentleman's Magazine for May, 1794, we have an account of an oak tree growing in Penshurst park in Kent, together with an engraving. It is called the bear or bare oak, from being supposed to resemble that which Camden thought gave name to the county of Berkshire. The dimensions of the tree are these.

	Ft.	In.
Girth close to the ground -	35	6
Girth one foot from the ground	27	6
Girth five feet from the ground	24	0
Height taken by shadow -	73	0
Girth of lowest, but not largest limb - - -	6	9

With respect to longevity, Linnéus gives account of an oak 260 years old; but we have had traditions of some in England (how far to be depended upon we know not) that have attained to more than double that age. Mr. Marsham, in a letter to Thomas Beevor, esq. Bath Papers, vol. i. p. 79, makes some very ingenious calculations on the age of trees, and concludes from the increase of the Bentley oak, &c. that the Fortworth chesnut is 1100 years old.

The oak perhaps that stands a chance of being most celebrated in future times is that at Yardley Lodge, which Cowper selected as the name of a didactic poem that every one who reads the little he lived to write must deeply regret he did not live to finish. It appears to have been known for some ages by the name of Judith; and Mr. Hayley suggests that it might have been so denominated from its being planted by the countess Judith, niece to the conqueror, whom he gave in marriage to the English earl Waltheof, with the counties of Northampton and Huntingdon as her dower. This however is suggestion and nothing more, though Cowper relates that there was a tradition in the neighbouring country that it had been an oak in the time of the conqueror, which is carrying its nativity still higher, though at the expence of Mr. Hayley's surmise. Whatever be its age, its girth, though considerable, is much less than several of those already noticed, being not more than 28 feet 5 inches as measured by the poet himself: it is also at this time quite in decay, a pollard and almost hollow. It is thus exquisitely described in the fragment above referred to.

Time made thee what thou wast—king of the woods!
And time hath made thee what thou art—a cave
For owls to roost in! once thy spreading boughs
O'erhung the champaign, and the numerous flock,
That grazed it, stood beneath that ample cope
Uncrowded, yet safe-sheltered from the storm.
No flock frequents thee now: thou hast outliv'd
Thy popularity, and art become
(Unless verse rescue thee awhile) a thing
Forgotten as the foliage of thy youth.
While thus through all the stages thou hast push'd
Of tree-ship—first a seedling hid in grass;
Then twig; then sapling; and, as century roll'd
Slow after century, a giant-bulk
Of girth enormous, with moss-cushion'd root
Upheav'd above the soil, and sides emboss'd
With prominent wens globose—till at the last
The rottenness, which time is charg'd to inflict
On other mighty ones, found also thee.

Besides the grand purposes to which oak-timber is applied in navigation and architecture, and its bark in tanning leather, there are various uses of less consequence to which the different parts of this tree have been referred. The bark is employed in the Highlands to dye yarn of a brown colour, or mixed with copperas, of a black colour. Oak saw-dust is a principal ingredient in dyeing drabs, especially fustians. The acorns of the tree are a good food to fatten swine and turkeys; and after the severe winter of 1709 the poor in France fed by constraint upon acorns themselves. The quercus esculus, however, of the south of Europe produces an acorn which is eaten by the inhabitants as an excellent food, and without any compulsion whatever.

In medicine its adstringent effects were sufficiently known to the ancients, but it is the bark which is now directed for medicinal use by our pharmacopœias. Oak bark manifests to the taste a strong adstringency, accompanied with a moderate bitterness. Like other adstringents, it has been recommended in agues, and for restraining hæmorrhages, alvine fluxes, and other immoderate evacuations. A decoction of it has likewise been advantageously employed as a gargle, and as a fomentation or lotion in *procidentia recti et uteri*. Galls, which, in the warm climate of the East, are found upon the leaves of this tree, are occasioned by a small insect with four wings, called cynips quercus folii, which deposits an egg in the substance of the leaf, by making a small perforation through the under surface. The ball presently begins to grow to a considerable size. Two sorts of galls are distinguished in the shops; one said to be brought from Aleppo, the other from Turkey and the southern parts of Europe. The former are generally of a blueish colour, or of a grayish or black verging to blueness; unequal and warty on the surface; hard to break; and of a close compact texture; the other of a light brownish or whitish colour, smooth, round, easily broken, less compact, and of a much larger size. The two sorts differ only in size and strength, two of the blue galls being supposed equivalent in

this respect to three of the others. Galls appear to be the most powerful of the vegetable adstringents. As a medicine, they are to be considered as applicable to the same indications as the oak-bark, and by possessing a greater degree of adstringent and styptic power, seem to have an advantage over it, and to be better suited for external use. Reduced to fine powder, and made into an ointment, they have been found of great service in hæmorrhoidal affections.

2. Q. phellos. Willow-leaved oak-tree. Grows forty or fifty feet high, with deciduous, lanceolate, very entire leaves, like the willow; whence its specific name. The acorns are sweeter than those of the common oak, and are eaten by the Indians. They afford, by expression, an oil little inferior to oil of almonds. It is a native of North America.

3. Q. prinus. Chesnut-leaved oak. Fifty or sixty feet high; leaves deciduous, ovate-elliptic, pubescent underneath, deeply toothed; teeth very white, obtuse, nearly equal. A native of North America.

4. Q. nigra. Black oak. Thirty or forty feet high; bark discoloured and dark; leaves annual, wedge-form, somewhat hearted, obscurely lobed, the lobes dilated. North America.

5. Q. rubra. Red oak. Sixty feet high; dark-greyish bark; leaves annual, but remaining late in autumn, of a reddish colour, glabrous on both sides, obtusely sinuate; the sinuses divaricate; segments acute with setaceous points. North America.

6. Q. alba. White bark. Thirty or forty feet high; bark whitish; leaves annual, pinnatifid; sinuses narrowed; segments oblong-linear without points. Virginia.

7. Q. esculus. Italian or small prickly-cupped oak-tree. Thirty feet high; bark purplish; leaves pinnatifid; pubescent underneath, with lanceolate acute segments; raments axillary, filiform; acorn oblong; calyx prickly. South of Europe. The acorns often made use of as food.

8. Q. ægilops. Great prickly-cupped oak. Seventy, eighty, or more feet high; trunk very large; head widely ramous; bark whitish. Leaves ovate-oblong, downy underneath, sinuate-trepand, with acute segments; calyx very large, clothed with scales spreading every way. Levant.

9. Q. cerris. Turkey oak. Thirty or forty feet high. Leaves sinuate, pinnatifid, pubescent underneath; with rather acute segments; raments axillary, filiform; calyx beset and rough with prickles. South of Europe.

10. Q. ilex. Ever-green, or holm oak. Forty or fifty feet high; bark smooth; leaves ever-green, lanceolate, or oblong, downy underneath; calyx ciliate; anthers ovate. Three varieties, as follow.

α. Leaves lanceolate, very entire.

β. Leaves lanceolate, serrate.

γ. Leaves oblong, with pungent teeth. A native of the south of Europe.

11. Q. gramuntia. Holly-leaved ever-green oak. Forty or fifty feet high; leaves like those of the holly; anthers roundish. South of France.

12. Q. suber. Cork-tree. Thirty or forty feet high; bark thick, tough, fungous, cleft; leaves evergreen, ovate-oblong, downy underneath, undulate. The common and useful material called cork is the outer bark of the tree, which is not destroyed by being carefully deprived of it; on the contrary a new coating, fit for the same purpose, is completed once in every six or seven years: see the article CORK. South of Europe.

13. Q. coccifera. Scarlet, or kermes oak. Fourteen or fifteen feet high, ramous, and bushy. Leaves ovate, hearted, tooth-spinous, glabrous on both sides, undulate. The branches are covered with small glandular excrescences which are the nidus of the insect called coccus ilicis, and produce the dying substance named kermes or scarlet pastel. See COCCUS and KERMES.

These are all propagated by sowing the seed or acorns. If that of the common oak be made use of, and a small plantation or a subsequent plantation be designed, prepare some beds of fresh earth neither too strong and heavy nor too light and dry. In these beds place the acorns in rows one foot asunder, and about two inches distance in the rows, covering them about two inches thick with the same fresh earth, none being left uncovered so as to entice the vermin, which may in a short time destroy all the seeds. In the spring, when the plants begin to appear, you must carefully clear them from weeds, and if the season proves dry, you should refresh them now and then with a little water. In these beds the plants should remain till the following autumn (observing constantly to keep them clear of weeds), at which time you should prepare a spot of good fresh earth, in size proportionable to the quantity of plants, which should be well trenched and levelled: then towards the middle or latter end of October, you should carefully take up the plants so as not to injure their roots, and plant them out in rows three feet asunder, and eighteen inches distance plant from plant, observing never to suffer the plants to abide long out of the ground, because their roots would dry, and endanger the growth of the plants. When they are planted, you should lay a little mulch upon the surface of the ground near in clumps in parks, &c. but if they are designed for timber, it is by much the better method to sow the acorns in the places where they are to remain; in order to which, you should provide yourself in autumn with a sufficient quantity of acorns, which should be always taken from straight, upright, vigorous growing trees. These should be gathered from under the trees as soon as may be after they are fallen, and if possible in a dry time, laying them in some open room to dry; after which they may be put in a dry sand, and preserved in a dry place till the end of November, when you should prepare the ground for planting them.

QUERCUS MARINA, the sea-oak. In botany, the name of one of the broad-leaved dichotomous sea-fucuses.

QUE'RELE. *s.* (*querela*, Latin; *querelle*, Fr.) A complaint to a court (*Ayliffe*).

QUE'RENT. *s.* (*querens*, Lat.) The complainant; the plaintiff.

QUERENGHI (Anthony), an Italian poet, who wrote in his own language and in Latin, born at Padua in 1546. He was secretary of the sacred college under five popes, and died at Rome in 1633. His Latin poems were printed at Rome in 1629, and the Italian in 1616, both in 8vo.

QUERFURT, a town of Upper Saxony, in Thuringia, capital of a principality of the same name, with a castle. It is situate on the rivulet Wute, surrounded by a ditch, 14 miles N.N.W. of Naumburg. Lon. 11. 50 E. Lat. 51. 23 N.

QUERIA, in botany, a genus of the class triandria, order trigynia. Calyx five-leaved; corolless; capsule one-celled; seed one. Three species; two American, one of Japan.

QUERIMBA, a cluster of small islands on the coast of Mosambique, fertile in fruits and pastures. They are inhabited by the descendants of Portuguese, and so named from the principal one. Lon. 41. 40 E. Lat. 11. 40 S.

QUERIMO'NIOUS. *a.* (*querimonia*, Lat.) Querulous; complaining.

QUERIMO'NIOUSLY. *ad.* Querulously; with complaint (*Denham*).

QUERIMO'NIOUSNESS. *s.* (from *querimonious*.) Complaining temper.

QUE'RIST. *s.* (from *quæro*, Lat.) An inquirer; an asker of questions (*Swift*).

QUERLON (A. G. Meusnier de), a native of Nantes, born in 1702. He published a periodical paper for the province of Britany 22 years, entitled Les petites affiches, and for five years of the same time conducted the Gazette de France, and took a part in the Journal Etranger, and Journal Encyclopedique. He published an edition of Lucretius with notes, and many other works. He died in 1780.

QUERN. *s.* (cpeopn, Saxon.) A handmill.

QUE'RPO. *s.* (corrupted from *cuerpo*, Spanish.) A dress close to the body; a waistcoat (*Dryden*).

QUE'RRY, for *equerry*. *s.* (*ecuyer*, Fr.) A groom belonging to a prince, or one conversant in the king's stables (*Bailey*).

QUE'RULOUS. *a.* (*querulus*, Latin.) Mourning; habitually complaining (*Howel*).

QUE'RULOUSLY. *ad.* In a complaining manner (*Young*).

QUE'RULOUSNESS. *s.* (from *querulous*.) Habit or quality of complaining mournfully.

QUE'RY. *s.* (from *quære*, Latin.) A question; an inquiry to be resolved (*Newton*).

To QUE'RY. *v. a.* (from the noun.) To ask questions (*Pope*).

QUESNAY (Francis), first physician to the king of France, and member of the academy of sciences of Paris, and of the royal society of London. He was born at Ecqueville in 1694, and was the author of a charming poem, called Maison rustique; and some other pieces in the line of his profession. He died in 1774.

QUESNE (Abraham, marquis du), born in Normandy in 1610. He was brought up to the naval service under his father. In 1637 he was at the attack of St. Marguerite, and the year following defeated the Spanish fleet before Cattari. In 1644 he entered into the Swedish service, and distinguished himself greatly against the Danes. In 1647 he returned to France, and was employed as commander of a fleet in the Mediterranean. In 1676 he displayed great skill and bravery against the Dutch fleet under Ruyter. He died at Paris in 1688.

QUESNEL (Pasquier), a priest of the congregation called the oratory, in France, born at Paris in 1634. He occasioned considerable disturbances in the church by his writings in defence of its ancient rights. Having embraced Jansenism, he was obliged to retire to Brussels, where after the death of Arnaud he became the head of his party. Pope Clement XI. issued the famous bull Unigenitus against his Reflections on the New Testament, in which a hundred and one propositions extracted from it were condemned. Quesnel fled to Amsterdam, where he died in 1719. He wrote several other works, and was a man of great learning and piety.

QUESNOY (Francis du), a Flemish sculptor, born at Brussels, and died at Leghorn in 1644. His performances shew great taste and elegance.

QUESNOY, a fortified town of France, in the department of Nord, with an old castle. It was taken by the allies in 1711, and retaken the same year. In 1793, it was taken by the Austrians, and retaken the next year. It is seated in an extensive plain, on the rivulet Ronelle, nine miles S.E. of Valenciennes, and 122 N.E. of Paris. Lon. 3. 40 E. Lat. 50. 15 N.

QUEST. *s.* (*queste*, French.) 1. Search; act of seeking (*Milton*). 2. An empannelled jury (*Shakspeare*). 3. Searchers. Collectively (*Shakspeare*). 4. Inquiry; examination (*Shakspeare*). 5. Request; desire; solicitation.

To QUEST. *v. n.* (*queter*, French.) To go in search.

QUE'STANT. *s.* (from *quester*, French.) Seeker; endeavourer after (*Spenser*).

QUE'STION. *s.* (*question*, French.) 1. Interrogatory; any thing inquired (*Bacon*). 2. Inquiry; disquisition (*Bacon*). 3. A dispute; a subject of debate (*John*). 4. Affair to be examined (*Swift*). 5. Doubt; controversy; dispute (*Tillotson*). 6. Judicial trial (*Hooker*). 7. Examination by torture (*Ayliffe*). 8. State of being the subject of present inquiry (*Hooker*). 9. Endeavour; search: not used (*Shakspeare*).

To QUE'STION. *v. n.* (from the noun.) 1.

To inquire (*Bacon*). 2. To debate by interrogatories (*Shakspeare*).

To QUE'STION. *v. a.* (*questionner*, Fr.) 1. To examine one by questions (*Brown*). 2. To doubt; to be uncertain of (*Prior*). 3. To have no confidence in; to mention as not to be trusted (*South*).

QUE'STIONABLE. *a.* (from *question.*) 1. Doubtful; disputable (*Baker*). 2. Suspicious; liable to suspicion; liable to question (*Shakspeare*).

QUE'STIONARY. *a.* (from *question.*) Inquiring; asking questions (*Pope*).

QUE'STIONABLENESS. *s.* (from *question.*) The quality of being questionable.

QUE'STIONER *s.* (from *question.*) An inquirer.

QUE'STIONLESS. *ad.* (from *question.*) Certainly; without doubt; doubtless (*South*).

QUE'STMAN. QUE'STMONGER. *s.* Starter of lawsuits or prosecutions (*Bacon*).

QUESTOR, or QUÆSTOR, in Roman antiquity, an officer who had the management of the public treasure. The questorship was the first office any person could bear in the commonwealth, and gave a right to sit in the senate. At first there were only two; but afterwards two others were created, to take care of the payment of the armies abroad, of selling the plunder, booty, &c. for which purpose they generally accompanied the consuls in their expeditions; on which account they were called *peregrini*, as the first and principal two were called *urbani*. The number of questors was afterwards greatly increased.

QUE'STRIST. *s.* (from *quest.*) Seeker; pursuer (*Shakspeare*).

QUE'STUARY. *a.* (from *quæstus*, Latin.) Studious of profit (*Brown*).

QUEUE, in heraldry, signifies the tail of a beast: thus, if a lion be borne with a forked tail, he is blazoned double queued.

QUEVEDO DE VILLEGAS (Francisco de), a Spanish author, of Madrid. He possessed great powers of writing in verse as well as prose, on subjects of wit, of morality, and of science. His works were published by Gonzales de Salas, under the title of Parnasso Espagnol, in 3 vols. 4to. His satire was so keen, and so imprudently used, that he rendered d'Olivares, the prime minister, his enemy, and in consequence was imprisoned. He died about 1645.

QUIBERON, a town in France, in the department of Morbihan, with a fort, situate at the extremity of a peninsula, to the N. of Belleisle. In 1795, it was taken by some French regiments in the pay of Great Britian; but owing to the desertion and treachery of some of the soldiers, the republicans soon took it by surprise. It was taken by the English in 1800, but evacuated soon afterward. It is 17 miles S.S.E. of Port Louis.

QUIB. *s.* A sarcasm; a bitter taunt.

QUI'BBLE. *s.* (from *quidlibet*, Latin) A slight cavil; a low conceit depending on the sound of words; a pun (*Watts*).

To QUI'BBLE. *v. n.* (from the noun.) To pun; to play on the sound of words (*L'Estrange*).

QUI'BBLER. *s.* (from *quibble.*) A punster.

QUICK. *a.* (cpic, Saxon.) 1. Living; not dead (*Common Prayer*). 2. Swift; nimble; done with celerity (*Hooker*). 3. Speedy; free from delay (*Milton*). 4. Active; spritely; ready (*Clarendon*).

QUICK. *ad.* Nimbly; speedily; readily (*Drayton*).

QUICK. *s.* 1. A live animal: not in use (*Spenser*). 2. The living flesh; sensible parts (*Sharp*). 3. Living plants (*Mortimer*).

QUICK, in botany. See CRATÆGUS.

QUICK-BEAM-TREE. See SORBUS.

QUICK-GRASS. The triticum repens of Linnéus is sometimes so called. See GRAMEN CANINUM.

QUICK-LIME. See LIME.

QUICK-MATCH. See MATCH.

To QUI'CKEN. *v. a.* (cpiccan, Saxon.) 1. To make alive (*Psalms*). 2. To hasten; to accelerate (*Hayward*). 3. To sharpen; to actuate; to excite (*South*).

To QUI'CKEN. *v. n.* 1. To become alive: as, *a woman* quickens *with child* (*Sandys*). 2. To move with activity (*Pope*).

QUICKEN-TREE. See SORBUS.

QUI'CKENER. *s.* (from *quicken.*) 1. One who makes alive. 2. That which accelerates; that which actuates (*More*).

QUI'CKGRASS. *s.* (*quick* and *grass*; *gramen caninum*, Lat.) Dog-grass.

QUI'CKLIME. *s.* (*calx viva*, Latin; *quick* and *lime.*) Lime unquenched (*Hill*).

QUI'CKLY. *ad.* (from *quick.*) Soon; speedily; without delay (*Shakspeare*).

QUI'CKNESS. *s.* (from *quick.*) 1. Speed; velocity; celerity (*South*). 2. Activity; briskness (*Wotton*). 3. Keen sensibility (*Locke*). 4. Sharpness; pungency (*Dryden*).

QUI'CKSAND. *s.* (*quick* and *sand.*) Moving sand; unsolid ground. See SAND and ARENA.

To QUI'CKSET. *v. a.* (*quick* and *set.*) To plant with living plants (*Tusser*).

QUICKSET-HEDGE, in gardening, denotes all live hedges, of whatever sort of plants they are composed, to distinguish them from dead hedges; but in a more strict sense of the word, it is restrained to those planted with the hawthorn, or cratægus oxycantha; under which name these young plants, or sets, are sold by the nursery-gardeners who raise them for sale. See CRATÆGUS, and HEDGE.

QUI'CKSIGHTED. *a.* (*quick* and *sight.*) Having a sharp sight (*Bentley*).

QUICKSI'GHTEDNESS. *s.* (from *quicksighted*) Sharpness of sight (*Locke*).

QUICKSILVER, a metal of a silvery-white colour, fluid at the usual temperature of the atmosphere. For its mineralogical and chemical properties, see HYDRARGYRUM and MERCURY.

From the facility with which this extraordi-

nary metal evaporates, and combines, not only with other metals, but with almost all other substances, and especially many of the elastic gasses, a considerable degree of injury is occasionally sustained by persons in the vicinity without their being aware of the cause. One of the most striking instances of this sort is the following:

In April, 1810, the Triumph man of war took on board thirty tons of quicksilver, contained in leather bags of 50lbs. each. These bags were picked up on the shore of Cadiz, from the wreck of two Spanish line of battle ships, lost in the storm immediately preceding, at the end of March, the above date. The collected bags were stowed below, in the bread room, after hold, and store-rooms: they were saturated with salt water, and, in about a fortnight, all decayed and burst. In the act of collecting and endeavouring to save the quicksilver in casks, much of it found its way to the recesses of the ship, beyond the possibility of recovery. Some portion, however, was secreted by the men, who amused themselves in various ways with it, as cleaning their spoons, &c.

At this period bilge water had collected in the ship, the stench from which was intolerable; and the carpenter's mate, in the act of sounding the well, was nearly suffocated. The effect of the gass escaping from bilge water is manifested, by its changing every metallic substance in the ship black. But in this instance metals of every kind were coated with quicksilver; and a general affection of the mouth took place among the men and officers, to a severe degree of ptyalism, in upwards of 200 men. The ship was sent to Gibraltar, had all her stores taken out, the hold made clean, and all the quicksilver, that could be reached, removed; but near ten tons were supposed still to remain between the ship's timbers below, which could only be cleared away by docking the ship, and dislodging a plank at the most descending part near the keel. After the process of cleaning the ship, however, had taken place, and a new atmosphere was created, all effects from the quicksilver ceased.

Now from well-established principles, as well as analogies, a very reasonable explanation may be given of this curious effect of the thirty tons of quicksilver, exposed to the action of the bilge water, from rotten leather bags, in a hot climate, and the beginning of summer.

The stinking gass, which was generated, was sulphuretted and perhaps phosphuretted hydrogen gass, mixed with carbonic acid and perhaps other gasses compounded by the putrefaction of animal and vegetable matter. The deadly suffocating effects of which gasses are fully ascertained, unless diluted with a large proportion of fresh air; and the tarnishing of metals, especially of silver, at a great distance, even when mixed with a large proportion of fresh air, is a well known effect of sulphuretted hydrogen.

These last named effects are attributable to the gasses of putrefaction independently of quicksilver. But when the influence of so large a body of this metal is considered, it will be easy to account for the whitening of metals and the salivation or sore mouth of many persons in the ship. The quicksilver would rise united or suspended by the above gasses, or be even evaporated by the heat of the ship, in the common fresh air. This metal so suspended or dissolved is very likely to penetrate the human body, and act upon it like the fumigation with quicksilver; but sulphuretted hydrogen dissolves the metal, and of course would carry it wherever the gass was transmitted.

It should be understood, that the sulphur and phosphorus were furnished probably by the decomposition of sulphuric and phosphoric acids, always present in all kinds of animal matter. The hydrogen gass was furnished chiefly by the decomposition of the water. The carbonic acid was compounded by the union of the charcoal of the animal and vegetable matter with the oxygen (principally) of the water.

The smell therefore resulted from the mixture of sulphuretted and phosphuretted gasses with putrifying matter. If the leathern bags of quicksilver had been kept dry, they would not have putrefied, but probably would have retained the metal, and the above effects would not have happened.

It is owing to this general readiness with which quicksilver unites with other substances, and especially with silver, that the chemist is able by a very easy process to obtain that beautiful ramified crystallization, which is usually denominated *Arbor Dianæ*. In the article subjoined to this term we have given the usual process, which is that of M. Baumé. M. Vitalis of Rouen has attained the same object, by modifying the common method; and this modification admits of our extracting with facility the metallic vegetation from the liquor, and preserving it, without any alteration, out of the vessel in which it has been formed.

The operation is very simple. In the nitric solutions of mercury and silver, both being well saturated and diluted with the quantity of water prescribed by Baumé, he suspended a small knot of fine linen rag doubled up, and containing five or six drachms of very pure mercury.

The metallic solutions soon penetrate to the mercury, which is inclosed in the rag, and we soon see some beautiful spiculæ formed and grouped around the rag, adhering to the nucleus of mercury, which serves as a kind of support to them.

These spiculæ progressively increase in size, and in a short time exceed an inch in length.

When we perceive that the metallic vegetation makes no more progress, the piece of rag with the spiculæ may be withdrawn from the liquor, and by means of a silk thread fastened to the cork of the bottle, the whole may be suspended under a bell glass. The crystals, which are tetrahedrons, may thus be kept as long as wanted.

M. Vitalis has in his own laboratory a crystallization of this description, which has preserved all its original beauty for these two years past.

It may be easily seen, that, in the above pro-

cess, the play of attractions is a little different from the common method as developed by M. Fourcroy in Systemé des Connoissance chimiques.

QUI'CKSILVERED. *a.* (from *quicksilver.*) Overlaid with quicksilver (*Newton*).

QUID PRO QUO, in law, *q. d.* "what for what," denotes the giving one thing of value for another; or the mutual consideration and performance of both parties to a contract.

QUID PRO QUO, or QUI PRO QUO, is also used in physic to express a mistake in the physician's bill, where *quid* is wrote for *quo*, i. e. one thing for another; or of the apothecary in reading *quid* for *quo*, and giving the patient the wrong medicine. Hence the term is in the general extended to all blunders or mistakes committed in medicine, either in the prescription, the preparation, or application of remedies.

QUI'DAM. *s.* (Lat.) Somebody (*Spenser*).

QUI'DDANY. *s.* (*quidden*, Ger. a quince.) Marmalade; confection of quinces made with sugar.

QUI'DDIT. *s.* A subtilty; an equivocation.

QUI'DDITY. *s.* (*quidditas*, low Lat.) 1. Essence; that which is a proper answer to the question, *quid est?* a scholastic term (*Hudibras*). 2. A trifling nicety; a cavil (*Camden*).

QUIEN DE LA NEUFVILLE (James le), an author of Paris, successively an officer in the French guards, an advocate at the bar, and lastly a literary character. His general history of Portugal, 2 vols. 4to. procured his admission into the academy of inscriptions. He afterwards published a treatise on the use of posts among the ancients and moderns, 12mo. which was well received. In 1713 he went with the French ambassador to Portugal, and was rewarded with a pension. Out of gratitude to the monarch, he determined to continue his history of Portugal, which had concluded in 1531, at the death of Emanuel I. but excessive application brought on disease. He died at Lisbon 1728, aged 81, leaving two sons.

QUIEN (Michael de), a French Dominican, published panoplia contra schisma Græcorum, 4to.—nullity of the English ordinations against Courayer—oriens christianus in quatuor patriarchatus digestus, &c. 3 vols. fol—defence of the Hebrew text against Perron, &c. 2 vols. fol. He died at Paris 1733.

QUIE'SCENCE. *s.* (from *quiesco*, Latin.) Rest; repose (*Glanville*).

QUIE'SCENT. *a.* (*quiescens*, Lat.) Resting; not being in motion; not movent; lying at repose (*Holder*).

QUI'ET. *a.* (*quiet*, Fr. *quietus*, Latin.) 1. Still; free from disturbance (*Spenser*). 2. Peaceable; not turbulent (*Peter*). 3. Still; not in motion (*Judges*). 4. Smooth; not ruffled (*Shakspeare*).

QUI'ET. *s.* (*quies*, Latin.) Rest; repose; tranquillity; peace; stillness (*Hughes*).

To QUI'ET. *v. a.* (from the noun.) 1. To calm; to lull; to pacify; to put to rest (*Forbes*). 2. To still (*Locke*).

QUI'ETER. *s.* (from *quiet.*) The person or thing that quiets.

QUI'ETISM. *s.* Tranquillity of mind.

QUIETISTS, a religious sect, famous towards the close of the last century. They were so called from a kind of absolute rest and inaction, which they supposed the soul to be in when arrived at that state of perfection which they called the unitive life; in which state they imagined the soul wholly employed in contemplating its God, to whose influence it was entirely submissive; so that he could turn and drive it where and how he would. In this state, the soul no longer needs prayers, hymns, &c. being laid, as it were, in the bosom and between the arms of its God, in whom it is in a manner swallowed up.

Molinos, a Spanish priest, is the reputed author of quietism; though the illuminati of Spain had certainly taught something like it before. The sentiments of Molinos were contained in a book which he published at Rome in the year 1681, under the title of the Spiritual Guide; for which he was cast into prison in 1685, and where he publicly renounced the errors of which he was accused. This solemn recantation, however, was followed by a sentence of perpetual imprisonment, and he died in prison in the year 1696. Molinus had numerous disciples in Italy, Spain, France, and the Netherlands. One of the principal patrons and propagators of quietism in France was Marie Bouvieres de la Mothe Guyon, a woman of fashion, remarkable for goodness of heart and regularity of manners; but of an unsettled temper, and subject to be drawn away by the seduction of a warm and unbridled fancy. She derived all ideas of religion from the feelings of her own heart, and described its nature to others as she felt it herself. Accordingly, her religious sentiments made a great noise in the year 1687; and they were declared unsound, after accurate investigation, by several men of eminent piety and learning, and professedly confuted in the year 1697, by the celebrated Bossuet. Hence arose a controversy of greater moment between the prelate last mentioned and Fenelon, archbishop of Cambray, who seemed disposed to favour the system of Guyon, and who, in 1697, published a book containing several of her tenets. Fenelon's book, by means of Bossuet, was condemned in the year 1699, by Innocent XII. and the sentence of condemnation was read by Fenelon himself, at Cambray, who exhorted the people to respect and obey the papal decree.

QUI'ETLY. *ad.* (from *quiet.*) 1. Calmly; without violent emotion (*Taylor*). 2. Peaceably; without offence (*Bacon*). 3. At rest; without agitation.

QUI'ETNESS. *s.* (from *quiet.*) 1. Coolness of temper (*Sidney*). 2. Peace; tranquillity (*Hayward*). 3. Stillness; calmness (*Reynolds*).

QUI'ETSOME. *a.* (from *quiet.*) Calm; still; undisturbed: not in use (*Spenser*).

QUI'ETUDE. *s.* (*quietude*, French; from *quiet.*) Rest; repose; tranquillity (*Wotton*).

QUILIMANCY, a seaport of Zanguebar, in the kingdom of Melinda. It belongs to the Portuguese, and stands at the mouth of a river

of the same name, 26 miles S.S.W. of Melinda. Lon. 41. 40 E. Lat. 3. 10 S.

QUILL. *s.* 1. The hard and strong feather of the wing, of which pens are made (*Bacon*). 2. The instrument of writing (*Garth*). 3. Prick or dart of a porcupine (*Arbuthnot*). 4. Reed on which weavers wind their threads (*Spenser*). 5. The instrument with which musicians strike their strings (*Dryden*).

QUILLS, are the large feathers taken out of the end of the wings of geese, ostriches, crows, &c. They are denominated from the order in which they are fixed in the wing; the second and third quills being the best for writing, as they have the largest and roundest barrels. Crow quills are chiefly used for drawing. In order to harden a quill that is soft, thrust the barrel into hot ashes, stirring it till it is soft, and then taking it out, press it almost flat upon your knee with the back of a penknife, and afterwards reduce it to a roundness with your fingers. Another method of hardening quills is by setting water and alum over the fire, and while it is boiling put in a handful of quills, the barrels only, for a minute, and then lay them by. Large quantities of quills are yearly imported in Britain from Germany and Holland. The goodness of quill is judged by the size of the barrels, but particularly by the weight; hence the denomination of quills of fourteen, fifteen, &c. loths; viz. the thousand consisting of twelve hundred quills, weighing fourteen, fifteen, &c. loths. The loth is a German weight, weighing something more than an ounce. Particular attention should be paid, on purchasing quills, that they may not be left-handed, that is, not out of the left wing.

QUILLET (Claudius), a French writer, born in Touraine, 1602. He practised physic for some years; but his views were changed by his interference with the affair of the nuns of Loudun, who were said to be possessed of the devil. He ridiculed the measures pursued there by the intrigues of Richelieu; and in consequence fled to Rome, for fear of persecution. He became, at Rome, secretary to d'Etrées, the French ambassador; and there he wrote his famous poem, called Callipædia, on the art of having fine children, in which he reflected, with satirical severity, on Mazarin. The cardinal, instead of persecuting the author, made him his friend, and gave him an abbey, and Quillet, in gratitude, when he published a second edition, erased the offensive parts, and dedicated it to his noble patron. This well-known poem is divided into four books, and is written in elegant poetry, and contains many beautiful passages, though it abounds in descriptions both indelicate and licentious. The Callipædia has been translated into English by Rowe. He wrote besides two other short Latin poems. He died 1661, aged 59.

QUI'LLET. *s.* (*quidlibet*, Latin.) Subtilty; nicety; fraudulent distinction (*Digby*).

QUILOA, a seaport of Zanguebar, capital of a kingdom of the same name, with a small citadel. This country was first discovered by the Portuguese, in 1498; and it produces abundance of rice, millet, fruits, cattle, and poultry. The inhabitants are Mahometans, partly black and partly tawny. The capital is well built, and stands on an island, at the mouth of the river Coavo. Lon. 40. 9 E. Lat. 8. 35 S.

QUILT. *s.* (*kulckt*, Dutch.) A cover made by stitching one cloth over another with some soft substance between them (*Pope*).

To QUILT. *v. a.* (from the noun.) To stitch one cloth upon another with something soft between them (*Spenser*).

QUILTING, a method of sewing two pieces of silk, linen, or stuff on each other, with wool or cotton between them; by working them all over in the form of chequer or diamond-work, or in flowers. The same name is also given to the stuff so worked.

QUIMPER, a city of France, capital of the department of Finesterre, and a bishop's see. It is seated at the conflux of the Oder and Benaudet, 34 miles S.S.E. of Brest, and 112 W. by S. of Rennes. Lon. 4. 6 W. Lat. 47. 58 N.

QUIMPERLE, a town of France, in the department of Finisterre, seated on the Isotte, 30 miles E.S.E. of Quimper.

QUIN (James), a celebrated performer on the English stage, was born at London in 1693. He was intended for the bar; but preferring Shakspeare to the statutes at large, he, on the death of his father, when it was necessary for him to do something for himself, appeared on the stage at Drury-lane. In 1720, he first displayed his comic powers in the character of Falstaff, and soon after appeared to as great advantage in sir John Brute; but it was upon Booth's quitting the stage that Quin appeared to full advantage, in the part of Cato. He continued a favourite performer until the year 1748, when, on some disgust between him and Rich the manager, he retired to Bath, and only came up annually to act for the benefit of his friend Ryan; until the loss of two front teeth spoiled his utterance for the stage. While Quin continued upon the stage, he constantly kept company with the greatest geniuses of the age. He was well known to Pope and Swift; and the earl of Chesterfield frequently invited him to his table: but there was none for whom he entertained a higher esteem than for the ingenious James Thomson. Mr. Quin's judgment in the English language recommended him to his royal highness Frederick prince of Wales, who appointed him to instruct his children in speaking and reading with a graceful propriety; and Quin being informed of the elegant manner in which his present majesty delivered his first gracious speech from the throne, he cried out in a kind of ecstacy, "Ah—I taught the boy to speak!" Nor did his majesty forget his old tutor; for, soon after his accession to the throne, he gave orders, without any application being made to him, that a genteel pension should be paid to Quin during his life. Mr. Quin, indeed, was not in absolute need of this royal benefaction; for as he was never married, and had none but distant relations, he sunk 2000l. which was half his fortune, in an annuity, for which he obtained 200l. a-year; and with about 2000l. more in the funds, lived in a decent manner

during the latter part of his life at Bath, from whence he carried on a regular correspondence with Garrick, and generally paid a visit to his friends in the metropolis once a year, when he constantly passed a week or two at Garrick's villa at Hampton. He died of a fever in 1766.

QUINARIUS, was a small Roman coin equal to half the denarius, and consequently worth about three-pence three farthings of our money. See MONEY. It was called quinarius, because it contained the value of five asses, in the same manner as the denarius was named from its containing ten.

QUINARY. *a.* (*quinarius*, Lat.) Consisting of five (*Boyle*).

QUINATE LEAF, in botany, a five-fold leaf. Five together in a whorl. As in some of the stellatæ.

QUINAULT (Philip), born at Paris, in 1635. He wrote a comedy called Les Sœurs rivales, at the age of eighteen, and it was performed with great success. Fifteen other pieces of his writing were acted between the years 1654 and 1666. He was appointed to compose an allegorical drama for the marriage of Louis XIV. which was played at the Louvre in 1660. He died in 1688.

QUINCE, in botany. See QUINCE-TREE.

QUINCE-TREE. See PYRUS CYDONIA.

QUINCE (Bastard). See MESPILUS.

To QUINCH. *v, n.* To stir; to flounce as in resentment or pain (*Spenser*).

QUINCHAMALA, in botany, a genus of the class pentandria, order monogynia. Calyx inferior, five-toothed; corol tubular, superior; anthers sessile; seed one. One species, a native of Chili, with alternate leaves and corymbed flowers.

QUINCU'NCIAL. *a.* (from *quincunx.*) Having the form of a quincunx (*Ray*).

QUINCUNX, in Roman antiquity, denotes any thing that consists of five-twelfths of another; but particularly of the as.

QUINCUNX ORDER, in gardening, a plantation of trees, disposed originally in a square; and consisting of five trees, one at each corner, and a fifth in the middle: or a quincunx is the figure of a plantation of trees disposed in several rows both length and breadthwise, in such a manner, that the first tree in the second row commences in the center of the square formed by the two first trees in the first row, and the two first in the third, resembling the figure of the five at cards. This disposition of trees was formerly much more regarded than at present; but is still much used in France, for planting trees to form a grove, and is expressed in the following form:



QUINDECAGON, in geometry, a plain figure with fifteen sides and fifteen angles; which, if the sides be all equal, is termed a regular quindecagon, and irregular when otherwise. The side of a regular quindecagon inscribed in a circle, is equal in power to the half difference between the side of the equilateral triangle and the side of the pentagon, inscribed in the same circle; also the difference of the perpendiculars let fall on both sides, taken together.

QUINDECIM VIR, XV. VIR, a Roman magistrate who had fourteen colleagues joined with him in the same function.

Under Tarquin the Proud, there were first two magistrates erected to take care of the sacrifices to be performed; these were called *duumviri*. Their number at length grew to ten, and then they were called *decemviri*. In the time of Cicero it had reached to fifteen, when they assumed the name of *quindecimviri*: and though their number grew to forty afterwards, yet Servius observes, on the sixth of the Æneid, that their name never after changed, but they still continued to be called *quindecimviri*.

They were the persons who examined the Sybils' books, and were the interpreters thereof; yet they never did this but by express order of the senate, declared by a senatus consultum. They also presided at the sacrifices, and all other extraordinary ceremonies of religion.

QUINQUAGE'SIMA. *s.* (Latin.) *Quinquagesima* Sunday, so called, because it is the fiftieth day before Easter, reckoned by whole numbers; shrove-sunday.

QUINQUA'NGULAR. *a.* (*quinque* and *angulus*, Latin.) Having five corners (*Woodward*).

QUINQUARTI'CULAR. *a.* (*quinque* and *articulus*, Latin.) Consisting of five articles (*Sandys*).

QUINQUATRIA, a festival in honour of Minerva at Rome, so called from the five days devoted to their celebration. The beginning of the celebration was the 18th of March. Scholars at this time obtained holidays, and it was usual for them to offer prayers to Minerva for learning and wisdom, and on their return to school, they presented their master with a gift called Minerval. They were much the same at the Panathenæa of the Greeks.

QUINQUECAPSULAR PERICARP, in botany. Having five capsules to a flower: as in aquilegia.

QUINQUEFID LEAF, in botany. A five-cleft leaf. Cut into five segments, with linear sinuses, and straight margins. Applied to the corol—and to the perianth, in nicotiana.

QUINQUEFO'LIATED. *a.* (*quinque* and *folius*, Lat.) Having five leaves.

QUINQUEFOLIUM. (from *quinque*, five, and *folium*, a leaf; so called because it has five leaves on each foot-stalk.) Cinquefoil or five-leaved grass. See PENTAPHYLLUM.

QUINQUEJUGOUS LEAF, in botany. A pinnate leaf, with five pairs of leaflets.

QUINQUELOBATE LEAF, in botany. A five-lobed leaf. Divided to the middle into five distant parts, with convex margins.

QUINQUELOCULAR PERICARP, in botany. A five-celled pericarp; as in pyrola.

QUINQUENALES LUDI. See ACTIAN GAMES.

QUINQUE'NNIAL. *a.* (*quinquennis*, Lat.) Lasting five years; happening once in five years.

QUINQUEPARTITE LEAF. A five-parted leaf. Divided into five parts almost to the base.—Applied to the perianth, in lithospermum.

QUINQUEVALVE PERICARP. A pericarp of five valves: as in hottonia.

QUINQUINA. See CINCHONA.

QUINSY, a term applied to sore throats generally, and hence embracing the whole family of cynanches if not of angimas.

QUINT. *s.* (*quint*, French.) A set of five (*Hudibras*).

QUI'NTAIN. *s.* (*quintain*, French.) A post with a turning top. See QUINTIN. (*Shakspeare*).

QUI'NTAL. *s.* (*centupondium*, Latin.) A hundred weight to weigh with.

QUINTE'SSENCE. *s.* (*quinta essentia*, Lat.) 1. A fifth being (*Watts*). 2. An extract from any thing, containing all its virtues in a small quantity (*Boyle*).

QUINTESSE'NTIAL. *a.* (from *quintessence*.) Consisting of quintessence (*Hakewill*).

QUINTILE, in astronomy, an aspect of the planets when they are 72 degrees distant from one another, or a fifth part of the zodiac.

QUINTILIANUS (Marcus Fabius), an illustrious rhetorician and critic, born in a Roman province in Spain, under Claudius Cæsar, about A. D. 42. He went to Rome very young, and is supposed to have accompanied Galba when sent by Nero into Spain. Upon the return of Galba to Rome, after Nero's death, Quintilian taught rhetoric at the expence of the government, and with the highest reputation. When he had obtained leave of Domitian to retire, he composed his admirable book called Institutiones Oratoriæ, the completest work which antiquity has left us for forming a perfect orator. Quintilian had pleaded at the bar, and, he says himself, defended queen Berenice in her presence. Quintilian spent the latter part of his life with dignity, but though some imagine he was consul, yet his name is not mentioned in the Fasti consulares. He was, however, preceptor to the grandsons of the emperor Domitian's sister. After betraying a puerile grief on the loss of his first wife, he married again, and had a daughter, to whom the younger Pliny gave a handsome dowry on her marriage. The greatest blemish in the character of this great orator and rhetorician is the excessive adulation which he paid to Domitian; whom he represents as one of the best of men, and to have abounded in moral virtue.

The editio princeps of Quintilian, printed in folio, at Rome, in 1470, is one of the rarest and valuable productions of the 15th century; it is even now doubted whether it was printed by Udal, Gallus, or Lignamine, though the preponderance of opinions is in favour of the latter. Gibson's edition, printed at Oxford in 1693, has been more undervalued than it ought to be. Burman's edition in 2 vols. 4to, published in 1720, is much and deservedly esteemed; as is also the reprint of Burman, at Padua, in 1736, in 2 vols. 8vo. But the most valuable and highly prized is Spalding's edition, published at Leipsic, in octavo, A. D. 1798, 1803, &c. There is a respectable English translation by Guthrie.

QUINTILIANS, a sect of ancient heretics, thus called from their prophetess Quintilia. In this sect the women were admitted to perform the sacerdotal and episcopal functions. They attributed extraordinary gifts to Eve for having first eaten of the tree of knowledge; told great things of Mary the sister of Moses, as having been a prophetess, &c. They added, that Philip the deacon had four daughters, who were all prophetesses, and were of their sect. In these assemblies it was usual to see the virgins entering in white robes, personating prophetesses.

QUINTILLUS (M. Aurelius Claudius), a brother of Claudius, who proclaimed himself emperor, and 17 days after destroyed himself by opening his veins in a bath, when he heard that Aurelian was marching against him: about the 270th year of the Christian era.

QUI'NTIN. *s.* An upright post, on the top of which a cross post turned upon a pin; at one end of the cross post was a broad board, and at the other a heavy sand bag; the play was to ride against the broad end with a lance, and pass by before the sand bag should strike the tilter on the back (*Ben Jonson*).

QUINTINIE (John de la), a French gardener, born at Poictiers in 1626. He was intended for the law, but applying his leisure hours to the study of ancient and modern writers on agriculture he renounced every other pursuit. He read Columella, Varro, Virgil, and others, who had written upon the subject; but he gained new lights by a journey to Rome with his pupil, who was the son of M. Tomboneau, president of the chamber of accounts. On his return home, Tomboneau entirely gave up to him his garden to manage as he pleased; and Quintinie made it so advantageous a theatre of experiment and observation, that his reputation spread all over France, when Louis XIV. made him director general of all his fruit and kitchen gardens. Quintinie died considerably advanced in years, and left a book of directions for the management of gardens.

QUI'NTUPLE. *s.* (*quintuplus.*) Five-fold.

QUINTUS CURTIUS RUFUS, a Latin historian, who flourished, as some suppose, in the reign of Vespasian or Trajan. He has rendered himself known by his history of the reign of Alexander the great. It was divided into ten books, of which the two first, the end of the fifth, and the beginning of the sixth, are lost. The work is admired for its elegance, the purity, and the floridness of the style; it is, however, blamed for great anachronisms, and glaring mistakes in geography and history.

Among the various editors of Quintus Curtius, there is none to whom we are more indebted than to Freinshem, whose first edition, with various readings and copious notes, was

published in 1640. The quarto variorum edition by Snakenburg, published at Leyden in 1724, is much and deservedly esteemed.

QUINZE. (so called from the number of the game.) In cards, a French game, usually played by only two persons, admired for its simplicity and fairness, dependent entirely upon chance, soon decided, and not requiring that attention which most other games on the cards stand in need of; and hence peculiarly calculated for those who are fond of an equal hazard.

It is called quinze from the number fifteen being the game, produced in the following manner.—First let the players shuffle the cards; and when they have cut for deal, which falls to his lot who cuts lowest, the dealer has the privilege to shuffle last. Having thus shuffled, the adversary cuts; after which the dealer gives one card to his adversary, and one to himself. If the adversary does not like his card, he has a right to have as many more given to him, one after the other, the pips of which will make fifteen, or come nearest to it, which are usually given from the top of the pack. For example: if he should have a deuce, and draw a five which make seven, he should go on in hopes of coming nearer to fifteen: if he draws an eight, which make just fifteen, being eldest hand he is sure of winning the game. But if he overdraw himself, and make above fifteen, he loses unless the dealer does the same, in which case it is a drawn game, and the stakes are to be doubled; thus proceeding till one of the party has won the game by standing, on being fifteen, or the nearest to it below that number. At the end of each game the cards are to be put together and shuffled, and the players are to cut for deal, the elder hand having constantly the advantage.

QUINZY. See QUINSY.

QUIP. *s.* A sharp jest; a taunt; a sarcasm (*Milton*).

To QUIP. *v. a.* To rally with bitter sarcasms.

QUIRE. *s.* (*chœur*, French; *choro*, Italian.) 1. A body of singers; a chorus (*Shakspeare*). 2. The part of the church where the service is sung (*Cleaveland*). 3. (*cahier*, Fr.) A bundle of paper consisting of twenty-four sheets.

To QUIRE. *v. n.* (from the noun.) To sing in concert (*Shakspeare*).

QUIRINALIA, festivals in honour of Romulus, sirnamed Quirinus, celebrated on the 13th of the calends of March.

QUIRINALIS, a hill at Rome, originally called Agonius, and Collinus. The name of Quirinalis it obtained from the inhabitants of Cures, who settled there under their king Tatius.

QUIRINUS, a sirname of Mars among the Romans. This name was also given to Romulus when he had been made a god by his superstitious subjects. (*Ovid*).—Also a sirname of the god Janus.—Sulpitius, a Roman consul born at Lanuvium. Though descended of an obscure family, he was raised to the greatest honours by the emperor Augustus.

QUIRISTER. *s.* (from *quire*.) Chorister; one who sings in concert, generally in divine service (*Thomson*).

QUIRITES, a name given to the Roman citizens, because they admitted into their city the Sabines, who inhabited the town of Cures, and who, on that account, were called Quirites. After this union, the two nations were indiscriminately and promiscuously called by that name.

QUIRK. *s.* 1. Quick stroke; sharp fit (*Shakspeare*). 2. Smart taunt (*Shakspeare*). 3. Slight conceit (*Watts*). 4. Subtilty; nicety; artful distinction (*L'Estrange*). 5. Loose light tune (*Pope*).

QUIRPON, an island in the Atlantic ocean, near the N. coast of Newfoundland. Lon. 55. 22 W. Lat. 51. 40 N.

QUISQUALIS, in botany, a genus of the class decandria, order monogynia. Calyx five-cleft, filiform; petals five; drupe five-angled. One species, an Indian shrub, with opposite heart-ovate leaves; spiked flowers.

QUISTELLO, a town of Italy, in the Mantuan, famous for an action between the French and Austrians in 1734, when marshal Broglio was surprised in his bed. It is seated on the Seccia, 15 miles S.E. of Mantua.

To QUIT. *v. a.* part. pass. *quit*; pret. *I quit* or *quitted*. (*quiter*, French.) 1. To discharge an obligation; to make even (*Denham*). 2. To set free (*Taylor*). 3. To carry through; to discharge; to perform (*Daniel*). 4. To clear himself of an affair (*Milton*). 5. To repay; to requite (*Shakspeare*). 6. To vacate obligations (*Ben Jonson*). 7. To pay any obligation; to clear a debt; to be tantamount (*Temple*). 8. To absolve; to acquit (*Fairfax*). 9. To pay (*Fairfax*). 10. To abandon; to forsake (*Ben Jonson*). 11. To resign; to give up (*Prior*).

QUI TAM, in law, is where an action is brought, or an information exhibited against a person on a penal statute, at the suit of the king and the party or informer, when the penalty for breach of the statute is directed to be divided between them; in that case, the informer prosecutes as well for the king as himself.

QUITCHGRASS. *s.* (cpice, Saxon.) Dog-grass (*Mortimer*).

QUITE. *ad.* Completely; perfectly (*Hook.*).

QUITO, an audience of Peru, lying between two chains of the high mountains called the Andes. The lands are generally well cultivated, and there are a great number of towns and villages inhabited by the Spaniards or native Americans. Every village is adorned with a large square, and a church on one side of it. The streets are generally straight, and in the direction of the four cardinal points; and all the roads are laid out in a line, crossing each other, that the aspect of the country has the appearance of a large garden. Although this country is situate on both sides the equator, yet it lies so high, and so near the mountains covered with snow, that the air is very temperate. There are no noxious animals; for the tigers and serpents are below in the forests. Several

districts of this country are occupied almost entirely by Indians; and the city of Quito alone contains between 50 and 60,000 of all the different races. This is the only province in Spanish America that can be called a manufacturing country. Hats, cotton-stuffs, and coarse woollen cloths, are made here in such quantities as to furnish a considerable article for exportation to other parts of Spanish America. This province was under the jurisdiction of the viceroy of Peru, until the present century, when a new viceroyalty was established at St. Fe-de-Bogota, the capital of the new kingdom of Granada; the jurisdiction of which includes the whole of Quito and all the provinces of Terra-Firma.

QUITO, a city of Peru, in an audience of the same name, and a bishop's see. It is seated in a pleasant valley, between high mountains, and on much higher ground than the rest of Peru that is habitable, being 300 yards above the level of the sea. Here are several religious communities, and two colleges, which are a sort of university. It is 820 miles N. of Lima. Lon. 77. 50 W. Lat. 0. 13 S.

QUIT-RENT, in law, a small rent that is payable by the tenants of most manors, whereby the tenant goes quit and free from all other services. Anciently this payment was called white-rent, on account that it was paid in silver coin, and to distinguish it from rent-corn.

QUITS. *interj.* (from *quit.*) An exclamation used when any thing is repaid and the parties become even.

QUITTANCE. *s.* (*quitance*, French.) 1. Discharge from a debt or obligation; an acquittance (*Shaks.*). 2. Recompence; return; repayment (*Shakspeare*).

To QUI'TTANCE. *v. a.* (from the noun.) To repay; to recompence: not used (*Shakspeare*).

QUI'TTER. *s.* A deliverer (*Ainsworth*).

QUITTER, or QUITTOR, in farriery, an ulcer formed between the hair and hoof usually in the inside of a horse's foot. It is generally produced by treads or bruises, sometimes by gravel which, working its way upwards, lodges about the coronet. If only superficial it may be dressed with digestive applications, intermixed with a little red precipitate. When the disease is deeper seated it is sometimes necessary to remove the quarter of the hoof, which after a cure has been accomplished is often attended with a grievous defect; for the new quarter as it grows up is apt to leave a pretty large seam that weakens the foot, which is called a false quarter; and the horse seldom recovers altogether from this imperfection. If the coffin-bone be injured by the matter of the quitter, it will be necessary to cut away still more of the quarter, and to apply the actual cautery or hot iron, pointed pyramidically. The foot, in this case, should be surrounded with a poultice, and dressed with tincture of myrrh and digestive ointment.

QUITTER-BONE. This is the disease of a quitter attacking the coffin-bone as just noticed in the preceding article, and enlarging its spongious texture by inflammation. It must be treated as already mentioned.

QUI'VER. *s.* (*couvrir*, French, *to cover.*) A case or sheath for arrows (*Spenser*).

QUI'VER. *a.* Nimble; active: not used (*Shakspeare*).

To QUI'VER. *v. n.* 1. To quake; to play with a tremulous motion (*Gay*). 2. To shiver; to shudder (*Sidney*).

QUI'VERED. *a.* (from *quiver.*) 1. Furnished with a quiver (*Milton*). 2. Sheathed as in a quiver (*Pope*).

QUIXOS, a province of Peru, in the audience of Quito.

QUIZAMA, a province in the S. part of the kingdom of Angola. It is full of mountains, and badly cultivated, but produces abundance of honey, wax, and salt. The inhabitants are warlike, and have not submitted to the Portuguese.

QUIZINA, a chain of mountains in the kingdom of Fez, 100 miles in length, extending from the desert of Gret to the river Nocor.

To QUOB *v. n.* To move as the embryo does in the womb. A low word.

QUO'DLIBET. *s.* (Latin.) A nice point; a subtilty (*Prior*).

QUODLIBETARIAN. *s.* (*quodlibet*, Latin.) One who talks or disputes on any subject.

QUODLIBETICAL. *a.* (*quodlibet*, Latin.) Not restrained to a particular subject.

QUOIF. *s.* (*coeffe*, French.) 1. Any cap with which the head is covered. See COIF. (*Shakspeare*). 2. The cap of a serjeant at law.

To QUOIF. *v. n.* (*coeffer*, French.) To cap; to dress with a headdress (*Addison*).

QUO'IFFURE. *s.* (*coeffure*, French.) Headdress (*Addison*).

QUOIL. *s.* See COIL.

QUOIN. *s.* (*coin*, Fr.) Corner (*Sandys*).

QUOIN, or COIN, on board a ship, a wedge fastened on the deck close to the breech of the carriage of a gun, to keep it firm up to the ship's side.

QUOIT. *s.* (*coete*, Dutch.) 1. Something thrown to a great distance to a certain point (*Arbuthnot*). 2. The discus of the ancients is sometimes called in English *quoit*, but improperly.

To QUOIT. *v. n.* (from the noun.) To throw quoits; to play at quoits (*Dryden*).

To QUOIT. *v. a.* To throw (*Shakspeare*).

QUO MINUS, is a writ which issues out of the court of exchequer to the king's farmer or debtor, for debt, trespass, &c. Though this writ was formerly granted only to the king's tenants or debtors, the practice now is become general for the plaintiff to surmise, that by the wrong the defendant does him, he is the less able to satisfy his debt to the king, by which means jurisdiction is given to the court of exchequer to determine the cause. This writ is to take the body of the defendant in like manner as the capias in the common pleas, and the writ of latitat in the king's bench.

QUONDAM. (Lat.) Having been formerly.

QUOOK. The pret. of *quake*: obsolete.

QUORUM, a word frequently mentioned in our statutes, and in commissions both of justices of the peace and others. It is thus called from the words of the commission, *quorum* A. B. *unum esse volumus*. For an example, where a commission is directed to seven persons, or to any three of them, whereof A. B. and C. D. are to be two; in this case, they are said to be of the quorum, because the rest cannot proceed without them: so a justice of the peace and quorum is one without whom the rest of the justices in some cases cannot proceed.

QUORUM, also signifies such a number of any officers as is sufficient to do business.

QUOTA. *s.* (*quotus*, Latin.) A share; a proportion as assigned to each (*Addison*).

QUOTATION. *s.* (from *quote.*) 1. The act of quoting; citation. 2. Passage adduced out of an author as evidence or illustration (*Locke*).

To QUOTE. *v. a.* (*quoter*, French.) To cite an author; to adduce the words of another.

QUOTER. *s.* (from *quote.*) Citer; he that quotes (*Atterbury*).

QUOTH. *verb imperfect.* (cpoðan, Saxon.) *Quoth I*, say I or said I; *quoth he*, says he or said he (*Hudibras*).

QUOTIDIAN. *a.* (*quotidien*, French; *quotidianus*, Latin.) Daily; happening every day.

QUOTI'DIAN. *s.* (*febris quotidianâ*, Latin.) A quotidian fever; a fever which returns every day. See FEBRIS INTERMITTENS.

QUOTIENT, in arithmetic, the number resulting from the division of a greater number by a smaller; and which shows how often the smaller is contained in the greater, or how often the divisor is contained in the dividend. The word is formed from the Latin *quoties*; *q. d.* How often is such a number contained in such another? In division, as the divisor is to the dividend, so is unity to the quotient.—Thus the quotient of 12 divided by 3 is 4; which is thus disposed, 3) 12 (4 quotient. See ARITHMETIC.

QUO-WARRANTO, in law, a writ which lies against a person or corporation that usurps any franchise or liberty against the king; as to have a fair, market, or the like, in order to oblige the usurper to shew by what right and title he holds or claims such franchise. This writ also lies for mis-user or none-user of privileges granted. The attorney-general may exhibit a quo-warranto in the crown-office against any particular persons, or bodies politic or corporate, who use any franchise or privilege without having a legal grant or prescription for the same; and a judgment obtained upon it is final, as being a writ of right.

R.

R, A liquid consonant, and the seventeenth letter of the alphabet.

The grammarians hold it a semi-vowel; especially in the Greek, where, in common with the other vowels, it admits an aspirate, &c. though whether the aspirate should be sounded before or after it, is some doubt. We find instances of each.

Thus ῥέδη the Latins wrote *rheda*; and ῥοδον the Ætolians wrote βροδον; and in English words derived from the Greek it is followed by an *h*, as *rhapsody*. The ancient Goths, and Teutones, Littleton observes, always prefixed *h* to *r*. See H.

The sound is formed by a guttural extrusion of the breath, vibrated through the mouth, with a sort of quivering motion of the tongue drawn from the teeth, with the tip a little elevated towards the palate.

The Hebrews allow the *r* the privilege of a guttural; that is, they never double it, which yet is done by the Arabs, Greeks, Latins, &c.

Persius calls the *r*, *litera canina*, because the dogs seem to pronounce it in snarling; yet it should seem to have had a softer sound among the Romans than among us, by its being frequently interposed to prevent the clashing of vowels; as in *rarus*, αραιος, *nurus* from νυος, *murex* from μυαξ, *mus muris* from μυς μυος; and this softness was such as frequently occasioned its being dropt as useless in writing.

Thus, for *Hetrusci* they frequently wrote *Thusci*, and even *Tusci*; and for *sursum*, *rursus*; *prorsus*, *susum*; *rusus*, *prosus*. In effect, there was that agreement between the sound of the *s* and *r*, that as the Romans avoided the doubling of their consonants, it was no wonder they here dropped the *r* in such words; the *s* supplying the place of both. Hence too it came to pass, that what they at first pronounced *asa*, *asena*, *casmen*, was afterwards *ara*, *arena*, *carmen*; and those first named *Fusii* and *Valesii* were afterwards called *Furii* and *Valerii*. Cicero tell us, the *Papirii* were first called *Papisii*; and even fixes the time when the change was made, viz. in the year of Rome 415. Festus adds, that *olera*, *pignora*, *plurima*, were anciently written *olesa*, *pignosa*, *plusima*.

From the same softness of the sound of the *r*, it came to be used indifferently with the *l*, in many words; e. gr. *Latiaris* and *Latialis*, *Palilia* and *Parilia*, &c.

Though the *r* more frequently degenerated into *l*; thus *remures* became changed into *lemures*; *interlego*, *perluceo*, into *intelligo* and *pelluceo*; *frater* into *fratellus*, &c. and the same is sometimes done between *n* and *r*, as *æreus*, and *æneus*, &c.

In the notes of the ancients, *R.* or *RO.* signified *Roma*; *R. C. Romana civitas*; *R. G. C. rei gerendæ causa*; *R. F. E. D. recte factum & dictum*; *R. G. F. regis filius*; *R. P. res publica*, or *Romani principes*; and *R. R. R. F. F. F. res Romana ruet ferro, fame, flamma.*

R was anciently a numeral letter, signifying 80; according to the verse,

Octoginta dabit tibi R, *siquis numerabit.*

When a dash was added at top, as $\overline{R}$, it signified eighty thousand.

The Greek *r*, ῥ, with a small mark over it, signified a hundred; with the same mark under it, it denoted 1000 × 100: thus ῥ, signified 100,000.

In the Hebrew numeration ר denoted 200; and with two horizontal points over it 1000 × 200; thus $\ddot{\text{ר}} = 200{,}000$.

R on the French coins denotes their being struck at Orleans.

R, or ℞, in medicinal prescription, stands for recipe, take: thus, ℞ *magnes. alb.* ℥j. signifies, take a dram of magnesia.

RAAB, a town of Lower Hungary, capital of Javerin, with a castle, and a bishop's see. It is a strong frontier bulwark against the Turks, and has two bridges, one over a double ditch, and another that leads toward Alba Regalis. It is seated at the confluence of the Raab and Rabnitz, not far from the Danube, 55 miles S.E. of Vienna. Lon. 17. 25 E. Lat. 47. 48 N.

RAAJEGUR, a town of Hindoostan Proper, in the province of Malwa, 74 miles N.E. of Ougein, and 214 S.S.W. of Agra. Lon. 76. 56 E. Lat. 24. 2 N.

RABASTEINS, a town of France, in the department of Tarn, with a decayed castle, seated on the Tarn, 18 miles W. by S. of Alby. Lon. 1. 52 E. Lat. 43. 46 N.

RABAT, a seaport of Algiers, in Tremesen, with a castle. It has fine mosques and handsome palaces, and is seated at the mouth of the Burigrig, between Fez and Tangier. Lon. 5. 28 W. Lat. 34. 40 N.

To RA'BATE. *v. n.* (*rabattre*, Fr.) In falconry, to recover a hawk to the fist again (*Ainsworth*).

To RA'BBET. *v. a.* (*rabatre*, French.) To pare down pieces of wood so as to fit one another (*Moxon*).

RA'BBET. *s.* (from the verb.) A joint made

by paring two pieces so that they wrap over one another (*Moxon*).

RABBI, or RABBINS, a title which the Pharisees and doctors of the law among the Jews assumed, and literally signifies masters or excellents. There were several gradations before they arrived at the dignity of a rabbin; which was not conferred till they had acquired the profoundest knowledge of the law and the traditions. It does not, however, appear that there was any fixed age or previous examination necessary; but when a man had distinguished himself by his skill in the written and oral law, and passed through the subordinate degrees, he was saluted a rabbin by the public voice. Among the modern Jews, for near 700 years past, the learned men retain no other title than that of rabbi, or rabbins; they have great respect paid them, have the first places or seats in their synagogues, determine all matters of controversy, and frequently pronounce upon civil affairs; they have even power to excommunicate the disobedient.

RABBINISTS, among the modern Jews, an appellation given to the doctrine of the rabbins concerning traditions, in opposition to the Caraites, who reject all traditions. See CARAITE.

RABBIT, a well-known animal of the hare-kind, with a short tail, and naked ears. In the wild state, the colour of the fur is brown; but, in a tame state, it varies to a black, pied, and quite white; the eyes are of a fine red. (See LEPUS.) In their wild state they inhabit the temperate and hot parts of Europe, and the hottest parts of Asia and Africa. The female, or doe rabbit, goes with young thirty days, and then kindles; and if she take not the buck at once she loses her month, or at least a fortnight, and often kills her young and eats them. In England they begin to breed at a year old, but in some places much sooner; and continue breeding very fast from the time when they begin, four, five, six, or seven times a year being common with them. The female sometimes brings eight young ones at a time. Supposing this to happen regularly for four years, the number of rabbits from a single pair would amount to 1,274,840. By this account we might justly apprehend being overstocked with these animals; but a great number of enemies prevent their increase; not only men, but hawks and beasts of prey making dreadful havock among them. Notwithstanding all these different enemies, however, we are told by Pliny and Strabo, that they once proved such a nuisance to the inhabitants of the Balearic islands, that they were obliged to implore the assistance of a military force from Augustus in order to exterminate them. The does cannot suckle their young till they have been at buck again; this therefore is to be done soon, else there is a fortnight lost of the time for the next brood, and the present brood also probably lost. When the buck goes to the doe, he always first beats and stamps very hard with his feet, and when he has copulated with her he falls backward, and lies, as it were, in a trance; in this state it is easy to take him, but he soon recovers from it. The buck-rabbit, like our boar-cats, will kill the young ones, if he can get at them; and the does in the warrens prevent this, by covering their stocks, or nests, with gravel or earth, which they close so artificially up with the hinder part of their bodies, that it is difficult to find them out. They never suckle the young ones at any other time than early in the morning and late at night, and always for eight or ten days close up the hole at the mouth of the nest, in this careful manner, when they go out. After this they begin to leave a small opening, which they increase by degrees, till at length, when they are about three weeks old, the mouth of the hole is left wholly open, that the young may go out; for they are at that time grown big enough to take care of themselves, and to feed on grass. When the young ones come to the mouth of the hole, and eat such herbs as the mother brings to them, the father seems to know them: he takes them betwixt his paws, smooths their hair, and caresses them with great fondness. Wild rabbits are much inferior in size, and many shades lighter in the colour of their fur, than the hare, to whom they have a natural and an invincible aversion; which, in fact, seems to be mutual, as they are but rarely found in the purlieus of each other. The rabbit, in its wild and uncultivated state, (not part of, or appertaining to a warren,) is thought of but very little intrinsic value, and is killed or taken as a matter of public right, by individuals of every class who happen to find them; not being included in the late acts of parliament for the preservation of the game; although they are mentioned as conies in some of the former records, which, though unrepealed, are seldom resorted to for legal information. Rabbits in a warren are supposed the most prolific and profitable animal of any that contributes to human subsistence: these warrens are common in many parts of the kingdom, but more particularly in Yorkshire, Lincolnshire, Norfolk, Suffolk, and Cambridgeshire, by the three last of which counties the metropolis is supplied for its almost infinite consumption. The scent of a rabbit is exceedingly faint in comparison with that of the hare, fox, or fallow deer; by jumping up suddenly, however, it frequently leads hounds a little astray, but cannot stand long before them.

In consequence of the rapidity with which rabbits breed, they increase so largely in some parks and farms of a woodland country as to become, by their numbers, exceedingly injurious, and an occasional reduction now, as in former times, is found necessary, as a matter of self-defence; in which case rabbit-shooting is a pleasant diversion. This is followed up by the assistance of a brace of spaniels, which being turned into the bushes and hedge-rows, are hardly ever without a rabbit on foot: but it must be a very quick and good shot that proves successful, as their short turns and sudden twists render them a very difficult mark to hit. Warreners, in some parts of the kingdom, are called warren farmers; their premises are of

very great extent, and their rent from three to four and five hundred pounds a year: the rabbits in these warrens are so completely private property, that various acts are still in force for their preservation, and a summary punishment of offenders (before a justice of peace) for any transgression against the statutes in such case made and provided.

RA'BBLE. *s.* (*rabula*, Latin.) A tumultuous crowd; an assembly of low people (*Raleigh*).

RA'BBLEMENT. *s.* (from *rabble.*) Crowd; tumultuous assembly of mean people (*Spenser*).

RABELAIS (Francis), a French writer famous for his facetiousness, was born at Chinon in Touraine, about the year 1483. He was first a Franciscan friar; but quitting his religious habit studied physic at Montpelier, where he took his doctor's degree. It is said, that the chancellor du Pratt having abolished the privileges of the faculty of physic at Montpelier, by a decree of the parliament, Rabelais had the address to make him revoke what he had done; and that those who were made doctors of that university wore Rabelais's robe, which is there held in great veneration. Some time after he came to Rome in quality of physician in ordinary to cardinal John du Bellay, archbishop of Paris. Rabelais is said to have used the freedom to jeer pope Paul III. to his face. He had quitted his religious connections for the sake of leading a life more agreeable to his taste; but renewed them on a second journey to Rome, when he obtained, in 1536, a brief to qualify him for holding ecclesiastical benefices; and, by the interest of his friend cardinal John du Bellay, he was received as a secular canon in the abbey of St. Maur, near Paris. His profound knowledge in physic rendered him doubly useful; he being as ready, and at least as well qualified, to prescribe for the body as for the soul: but as he was a man of wit and humour, many ridiculous things are laid to his charge, of which he was quite innocent. He published several things; but his chief performance is a strange incoherent romance, called the History of Gargantua and Pantagruel, being a satire upon priests, popes, fools, and knaves of all kinds. This work contains a wild, irregular profusion of wit, learning, obscenity, low conceits, and arrant nonsense; hence the shrewdness of his satire, in some places where he is to be understood, gains him credit for those where no meaning is discoverable. Some allusions may undoubtedly have been so temporary and local as to be now quite lost: but it is too much to conclude thus in favour of every unintelligible rhapsody; for we are not without English writers of great talents, whose sportive geniuses have betrayed them into puerilities, no less incoherent at the times of writing than those of Rabelais appear above two centuries after. He died about 1553.

RA'BID. *a.* (*rabidus*, Lat.) Fierce; furious; mad.

RABIES CANINA. See HYDROPHOBIA and LYSSA.

RABIRIUS, (C.) a Roman knight, who lent an immense sum of money to Ptolemy Auletes, king of Egypt. The monarch afterwards not only refused to repay him, but even confined him. Rabirius escaped from Egypt with difficulty, and at his return to Rome he was accused by the senate of having lent money to an African prince, for unlawful purposes. He was ably defended by Cicero, and acquitted with difficulty.—2. A Latin poet in the age of Augustus, who wrote a poem on the victory which the emperor had gained over Antony at Actium. Seneca has compared him to Virgil for elegance and majesty, but Quintilian is not so favourable to his poetry.

RACCOON. In mastiology. See URSUS.

RACE. *s.* (*race*, Fr. from *radico*, Lat.) 1. A family ascending. 2. Family descending (*Milton*) 3. A generation; a collective family (*Shakspeare*). 4. A particular breed (*Milton*). 5. RACE *of ginger*. A root or sprig of ginger. 6. A particular strength or taste of wine. (*Tem.*). 7. (*ras*, Islan.) Contest in running (*Milton*). 8. Course on the feet (*Bacon*). 9. Progress; course (*Milton*). 10. Train; process (*Milton*).

RACE, a trial of speed between men or animals. Races are most commonly run by horses trained for the purpose. See the articles RACE-HORSE, MATCH, &c.

RACE-HORSE, a horse bred for the turf, or, in other words, calculated for speed. See HORSE-RACING. In his chapter on Running Horses and the Turf, Mr. John Lawrence contends for "the necessity, or at least the utility, of a reserve of thorough-bred horses in this country, on the ground, that were the species neglected, and suffered to be indiscriminately blended amongst the whole genus, the English saddle-horse would, in all probability, become retrograde in quality, and in the course of time would degenerate into the round buttock, gummy carcase, and coarse head, of former days." In fact, examples enough of this degeneracy are always to be seen, he says, in the studs of the different breeders; neither is the number of well-shaped half-bred stallions considerable, or even sufficient for the demand of the country. In opposition to the idea which some entertain of the propriety of putting an end to horse-racing by law, "On the course only," says he, "can the worth of this peculiar species of the horse be essayed; and, independent of that object, it is scarcely probable that the breed would be kept distinct, or that any very minute attention would be bestowed upon pedigree. It is well known, that not only have varieties of a genus of animals been often blended and lost by neglect, but even arts and different branches of knowledge have perished in the same way. From the discontinuance of horse-racing, the English thorough-bred horse, the source of almost all that is excellent in the species, might become extinct. Thus the turf is a grand national object, and its votaries are administering, through the medium of their pleasures, to the interest and prosperity of their country."

"The speed and continuance of race-horses must necessarily be affected and governed, in certain degrees, by the weight which they have

to carry; and reasoning upon that position, it will be easily conceived, that if two horses be equally matched in point of speed and strength, and put to their utmost exertion for a considerable distance, the horse which carries the least weight, by even only a single pound, must infallibly have the advantage to a certain degree (however small), and possess the ability of going more swiftly and lasting longer than his antagonist. The swifter the pace, and the longer it is continued, the more in proportion will the horse be affected by the weight he carries. It is said, that, in running four miles, seven pounds make the difference of a distance, or two hundred and forty yards, between horses of equal goodness. Weight is therefore regulated with scientific precision upon the turf, and forms a prime consideration in all sporting transactions. The weights carried by race-horses vary from the maximum twelve stone, fourteen pounds to the stone, to a feather, which means a boy of the lightest weight to be found."

The thorough-bred courser, Mr. Lawrence thinks, in a general point of view, the most useful species of the horse, as being applicable to every purpose; which cannot be asserted of any other species. He defines a thorough-bred horse, or racer, to be originally the produce of Asia or Africa, or of the south of Europe. The chief object in breeding a race-horse, he thinks, ought to be truth and symmetry in the cardinal points.

As to the "integrity of his blood," he observes, "a true racing pedigree, according to the rule of the present time, ought to prove under the hand of the breeder, that the horse has descended from ancestors of genuine racing blood, without the intervention of a single bastard cross. If the pedigree be long, it is common to take it for granted that there is blood sufficient, although there be no mare mentioned in it, which has proved her blood by her having actually raced; but usually all the horses are reputed runners, or brothers of such. The greater number of mares which have raced contained in a pedigree, the surer and more valuable, no doubt, it must be, particularly if the last-mentioned be specified as a reputed racer, or a natural Arabian or Barb. A pedigree of one single descent is held sufficient, when the sire and dam are named as reputed and tried runners: otherwise a short pedigree of three or four descents would not constitute a horse thorough-bred, though it might serve for a hunter.

"It is yet easy to conceive," he adds, "how liable the pedigree of a horse must be both to error and imposition, and that the best proof of true blood must ever consist in performance. Various accidental bastard crosses have occurred in our racing breed, at different periods, chiefly distant ones; and they are frequently easy to distinguish in the figure of the stock, by a critical eye. The far greater part of those horses brought over to this country, under the general appellation of Arabians, have, I believe, never seen Arabia, or else have been of its inferior breed. They are usually purchased in the Levant, Barbary, or the East Indies, by persons totally unacquainted with horses, or at any rate with the peculiar purpose for which such horses are designed; hence a number of inferior and half-bred Arabians have been brought over at a useless expence, to deteriorate instead of amending our racing breed, and to bring Arabian blood into disrepute."

With a view to assist his readers in forming adequate ideas of the phenomena of blood in horses, Mr. Lawrence, in his chapter On running Horses and the Turf, exhibits the following facts, which, he says, rest upon the ground of constant and invariable experience, namely, "Fine and delicate horses, the natives of warm climes, excel in swiftness; the most perfect of these were originally found in Arabia, but they are improvable in their descendants by a more fruitful country; the Arabians tried in England have never proved themselves in any respect equal upon the course to the English racers, the descendants of their blood. Although the general characteristic of thorough blood is speed, yet the true test is not speed, but continuance, since many common or half-bred horses have been known to possess racing speed, but no instance has ever occurred of its continuance in those beyond perhaps half a mile: the powers of continuance increase in proportion to the quantity of blood; thus, three-part bred horses will persevere longer than half-bred, and those got by bred horses out of three-part bred mares will sometimes equal the real racers. Although, amongst horses equally well bred, superior external conformation will generally prevail in the race, yet racing can in no sort be said absolutely to depend on good shape; it depends entirely on blood: for example, take the worst shaped true-bred horse you can find, and the best shaped common horse; let the latter have a fine coat, loose thrapple, high and declined shoulder, length, speed, in fine, all the admired points of the racer (and such common horses are occasionally to be found); let them run four miles, and the bred horse, although out-footed at first, shall always win the race. This principle is so universal, that perhaps it would be altogether impracticable to find a thorough-bred horse in England sufficiently bad, to be beat four miles by the speediest and best common bred hack. All bred horses cannot race, many of the highest blood having neither the gift of speed nor continuance; many are defective in the material points of conformation, as it happens in common horses."

The author cites some curious instances of speed. "The usual trial of speed in the English racing," says he, "is the distance of a single mile; of continuance, stoutness, or bottom, four miles. It has been asserted with confidence, but not proved, that Flying Childers ran a mile over Newmarket in the space of a minute; a velocity so immense, that it turns one's ideas to speed in the abstract, or ubiquity. It has, however, been really performed in a few seconds over a minute; an instance of which, within my present recollection, is that of Firetail and Pumpkin.

"The distance of four miles was ran by Childers, in 1721, carrying nine stone two pounds, in the space of six minutes forty-eight seconds. This wonderful animal leaped ten yards with his rider, upon level ground; and is supposed to have covered, at every stride, a space of twenty-five feet, which is more than forty-nine feet in a second. Bay Malton ran four miles over York, in 1763, in seven minutes forty-three seconds and a half. Eclipse ran the same distance over York, in eight minutes, with twelve stone."

Of those who have pretended, that they were

unable to discriminate between speed and stoutness in a race-horse, Mr. Lawrence satisfactorily enquires, "What is the cause or basis of that superior speed, endurance, and strength, which distinguish the southern horse? Doubtless a peculiar innate quality of body, which some attribute to the dry and elastic air of those countries where he is bred, but which appears to me not altogether satisfactory. The game, or wild animals of northern climes, possess the peculiar qualities of the race-horse, which they lose in a few generations, on being domesticated; their bones becoming soft and spongy, like those of tame animals in general. The race-horse is much stronger than the cart or common horse, weight for weight; his substance being of a more solid texture."

"The training of race-horses (continues he) is now a much more simple and rational process than in former days, and is indeed making a gradual approach to perfection. It was the fashion of old, to stuff horses, under preparation for the course, with many different kinds of baked bread, to load them with an immense burden of clothes, to force them to breathe a suffocating heat within doors, and greatly to overdo them with severe and long continued exercise. Breads have long since been banished the running stables, where the heaviest oats, and the hardest and sweetest hay, are found to answer completely every purpose of nutrition. Race-horses are no longer stifled with heat, like variolous patients under the ancient regimen. The usual length now of the exercise gallop, is from a mile to a mile and a quarter; of the sweat, from four to five miles."

The training of the race-horse must, of necessity, be most regular and efficacious, on account of the superior and sudden exertions required of him. Hence the custom of sweating, either once in ten days, weekly, or still oftener according to the animal's hardness of carcase and proneness to obesity. The method of sweating a race-horse, is to load him with a double or triple quantity of clothes, and to run him four or five miles upon the turf, keeping him in general to a long steady gallop, or his rate, but making occasional bursts of speed. After this operation, the horse is taken within doors, and gradually uncovered, whilst the sweat is scraped from all parts of his body with an edged wooden instrument; when, being rubbed perfectly dry, his accustomed clothing is replaced. Sweating is usually performed in the morning.

Mr. Lawrence next describes the familiar life of the race-horse. His winter, he says, is usually spent in the paddock and loose stable, enjoying himself at his ease, until the period of physic arrives, which must be so fixed, that there be at least an interval of two months between the last dose and the first race: this interval is of course spent in exercise. The author assumes here, with the majority of persons concerned in training, that no race-horse can perform, to the full extent of his natural powers, without having undergone a course of purgatives. The spring and summer are passed in exercise and racing, the horse perhaps travelling to a number of different courses in the country. A racer travels, perhaps, from twenty to twenty-four miles per day; and this, on the hard road, must of course abate his speed, whence arises the advantage of those which have been trained on the spot where they are intended to run. Mr. Lawrence says, he has also been assured by grooms, that a horse, in the midst of the racing season, when a sufficient interval can be spared, is frequently much benefited by a dose of physic. That the practice admits of extremes, the following judicious remarks very fully evince.

"The purging system of the running stables is still liable to solid objections. Grooms always fancy that the body of a horse abounds with noxious humours, which require specific purgation. In their ideas, racing and aloetic or mercurial physic are connected by an indissoluble chain; and these nostrums are supposed to operate by a peculiar innate virtue or charm. All this is of much the same weight with any other nonsense which prescription may have sanctioned. The exhibition of physic in this case bears no more relation to the expulsion of evil humours from the body of a horse, than to the extirpation of corns in his feet: the sole intent is the detrusion of accumulated alvine fæces, in better English, unloading the stuffed bowels, attenuating the blood, and refrigerating or cooling the general habit. Against the best aloes no general objection can possibly lie; it is a cathartic, equally mild, safe, and efficacious; but I know of no possible business a groom can have with mercurials, in the case of physicing merely for condition. In some instances, the neutral salts might be substituted even for aloes, with great advantage; I mean with washy, hot, and irritable horses, which soon part with their flesh. If a person accustomed to the stable forms would not be satisfied that his horse could race, having been purged with Glauber's salts only; let him make the essay with one which he does not intend should run to win.

"It appears to me, that race-horses are invariably over-purged, either by an excess in the number or strength of the doses, or by the use of Barbadoes aloes, or mercury. Such a cause can never fail of the effect of detracting from a horse's speed, and of debilitating him, however it may possibly elongate his stride. The cords and pullies of the machine are deprived of too much of their spring, in which consists both the edge of speed and the grasp of continuance. The exercise also is, I am convinced, even yet too severe and indiscriminate, and our horses are often brought to the post in a condition much below their work. The external signs of this error are, want of cheerfulness, delicate feeding, refusal of water, or greediness of it, loose testicles, and backwardness in recovery of flesh after training. Many a colt, I believe, is tried and rejected, at the same time, seven or ten pounds the worse over the course, for his exercise and physic."

Mr. Lawrence acknowledges the truth of the common observation, "that a horse cannot run fat;" but insists, at the same time, that a very erroneous use is generally made of the maxim. The material question, he says, is, what is the proportion of physic and exercise calculated for such horses? a question which must be left to the discretion of men of sense and experience. If a horse, after three doses of physic, regular gallops, and a week's sweating, still carry a shew of superfluous substance, Mr. Lawrence would even start him under this disadvantage, rather than attempt to break down the texture of the animal with mercurial purges, or work him off his legs and speed, with extra sweats and violent galloping. "How often," says he, "have I

heard of horses, which were before ready to devour the manger, sweated out of their appetite, and then, if time could possibly be allowed, to mend the matter, purged with strong mercurial physic. The universal panacea of purgation is resorted to on all occasions."—"The error is still more gross, to over-train horses of naturally weak stamina and irritable habits; such should always have a due portion of fleshy substance left to support the tremulous and flagging fibres. I suspect the usual routine of exercise is always too severe for these, but from its being general and common to them all, its ill effects are less apparent. There are horses which become bone lean in two or three weeks exercise; I would ask, why continue to sweat such, since they appear to have no fatty substance left to sweat away? Washy horses particularly, I believe, get rid of their internal fat first, and, for the sake of their wind, would it not be better to sweat or rather give them a four-miles moderate gallop, in only their ordinary clothes, without any additional weight? which last, to the amount generally laid on, must debilitate in a very considerable degree. I have seen some of your hot fly-away racers so excessively influenced by nervous affection, that their lives seemed to be one continued state of anxiety and inquietude. These are always found awake to dreadful expectation: the groom touching their body-girth, sets their hearts palpitating; the act of taking down the saddle operates as a cathartic to the imagination, which, from sympathy, is instantaneously followed by visible effects; they well know the sweating day, and the sight of the sweating clothes gives them a fit of the horrors. The secret of training these horses is, I should think, to give them as little work as possible, and that by themselves; to endeavour to render their exercise rather a pleasure than a fatigue and a terror to them; and not to be alarmed at the little extra flesh they may bear, which will surely rather help to carry them through, than retard their course."

The same well-informed writer offers some remarks upon an established doctrine of the stables, that half-bred horses will not stand training: "There is no doubt," he says, "that full-bred cattle are naturally best adapted to such a purpose; but the inability of the half-bred to endure this discipline arises chiefly from its severity, and the want of its proper adaptation to their natural powers. There is comparative speed and stoutness in every variety of the horse; and Bracken has said, that, by proper training, he could enable even a cart-horse to run up to his foot. A remarkable quality in the race-horse is that which is styled, in the language of the turf, running to the whip; it means answering every stroke of the whip with an additional exertion, as long as nature lasts. Horses of this generous kind are termed 'honest,' and 'stout:' but the terms are usually confounded; for many a horse is honest, without being endowed with those constitutional powers necessary to produce stoutness or continuance; and many which possess those in the amplest measure, which they occasionally evince, are yet never to be depended upon. It is dangerous to offend these last with the immoderate use of the whip or spur, and I have known a winning horse stopped instantly by a foul cut under his flanks: I have also known, and indeed ridden horses, honest and stout as the course was long, yet with such indignant stomachs, and such critical skill in their own powers, that being convinced in a race of the impossibility of success, if abused with the whip, they would instantly shorten their stroke; but if nursed, and encouraged with a pull, the use of which every jockey knows, would, although beaten, strain every nerve to the last extremity. It is a strange quality in the true whipped horse, that he seems really to have a penchant for the whip and spur, since he absolutely will not keep to his stroke without the one or other of them, and never takes offence at either."

The earliest instances of horse-racing upon record are the reign of king Charles II. who sent abroad his master of the horse to procure a selection of foreign horses and mares for the establishment of a breeding stud; the mares then brought over were denominated, as many of their produce have been since, royal mares. The principal Arabians, Barbs, and Turks, by which the original breed of Britain is supposed in some respects to have been improved, are as follows. 1. The White Turk, the property of Mr. Place, stud-master to Oliver Cromwell when protector; he was the sire of Wormwood and Commoner. 2. Dodsworth, though foaled in England, a natural Barb, his dam having been imported when in foal during the reign of Charles II. and called a royal mare. 3. The Lister Turk, brought into England by the duke of Berwick from the siege of Buda, in the reign of James II. the sire of Snake, Brisk, Coneyskins, and Piping Peg. 4. Byerly Turk, Captain Byerly's charger in Ireland in king William's wars; he was sire of Sprite, Black-Hearty, Archer, Basto, Grasshopper, the Byerly gelding, and Jigg. 5. Greyhound, got in Barbary, after which both sire and dam were purchased, and brought to England, by Mr. Marshall. He was the sire of Old Othello, Whitefoot, Osmyn, Rake, Sampson, Goliah, Favourite, and Desdemona. 6. D'Arcy White Turk, the sire of Old Hautboy, Grey Royal, and Cannon. 7. D'Arcy Yellow Turk, the sire of Spanker, Brimmer, and the great great grand-dam of Cartouch. 8. The Marshall, or Sellaby Turk, the property of Mr. Marshall's brother, stud-master to king William, queen Anne, and king George I.; he was the sire of some famous runners, but most of them were mares. 9, 10, 11, 12, 13. Curwen's Bay Barb, the Thoulouse Barb, Darley's Arabian, the Belgrade Turk, and the Godolphin Arabian.

Races were formerly decided in much shorter distances than at present, and few colts or fillies were then ever brought to the post till four years old. Plates for three years old are now common at all places of sport from one extremity of the kingdom to the other; and matches with two years old colts and fillies, and even with yearlings, are seen constantly run at Newmarket; and are the very reason why so many of the most valuable are completely ruined, and all their faculties of superior speed destroyed, by the very time they attain the age at which their predecessors first started. Few matches, sweepstakes, or plates, are now decided in a less distance than four miles, where the horses are five and six years old, as this is considered an unerring criterion of distinguishing between, or annexing bottom to speed: many tolerable horses have taken the lead, and kept it for a mile, or even two, that have been nearly distanced in running the four; and to observations of this kind it is

owing that the propagation of Arabian blood in this country has fallen into disrepute. Whether such change may not also have been occasioned by national prejudice in conjunction with public report, may admit of a doubt; since it is universally known, that very many, of the fleetest horses this country ever produced, have been the immediate descendants from an Arabian breed.

The pedigrees of all thorough-bred horses have been so long studied and recorded, by amateurs, that Mr. Weatherby has given in his stud-book the genealogy of above four thousand horses, mares, colts, and fillies, the produce of the last sixty years only (exclusive of numbers of an earlier date), and in which may be traced the precise pedigree of every particular horse, up to the origin of any race or blood upon record.

RACEMA'TION. *s.* (*racemus*, Lat.) Cluster, like that of grapes (*Brown*).

RACEMI'FEROUS. *a.* (*racemus* and *fero*, Lat.) Bearing clusters.

RA'CER. *s.* (from *race.*) Runner; one that contends in speed (*Dorset*).

RACER, in gardening, a name applied to a peculiar sward-cutter; an instrument employed for the purpose of racing out, or cutting through the surface of grass sward and dividing it into proper widths, lengths, and thickness, as turf for lining pleasure-grounds. It is also employed in cutting and straightening the edges of grass verges in the same grounds.

RACHIALGIA. (from ῥαχις, the spine, and αλφυ, pain.) A pain in the spine. It was formerly applied to several species of cholic which induced pain in the back.

RACHIS. (ῥαχις, the back bone.) In botany, the spine. Receptaculum filiforme, flosculos longitudinaliter annectens in spicam. Delin. Pl.—Receptaculum spicæ graminis cui flores insculpti. Regn. Veg.—A filiform receptacle connecting florets longitudinally into a spike: as in panicum crus-corvi and crus galli, lolium, and many other grasses.—It has the name from some resemblance which it bears to the spine, when it is naked or deprived of the florets. Dr. Withering calls it the spike-stalk.

This term is also sometimes used for the principal rib of a leaf.

RACHITIS. (ῥαχιτις; from ῥαχις, the spine of the back; so called because it was supposed to originate in a fault of the spinal marrow.) The rickets. A species of diseases in the class cachexiæ, and order intumescentiæ of Cullen; known by a large head, prominent forehead, protruded sternum, flattened ribs, big belly, and emaciated limbs, with great debility. It is usually confined in its attack between the two periods of nine months and two years of age, seldom appearing sooner than the former, or showing itself for the first time after the latter age. The muscles become flaccid, the head augments, the carotids are distended, the limbs waste away, and their epiphyses increase in bulk. The bones and spine of the back are variously distorted; disinclination to muscular exertion follows: the abdomen swells and grows hard; the stools are frequent and loose; a slow fever succeeds, with cough and difficulty of respiration: atrophy is confirmed, and death ensues. It frequently happens that nature restores the general health, and leaves the limbs distorted.

After death, the liver and spleen have been found enlarged and scirrhous; the mesenteric glands indurated, and the lungs either charged with vomicæ, or adhering to the pleura; the bones soft, the brain flaccid or oppressed with lymph, and the distended bowels loaded most frequently with slime, sometimes with worms.

It is remarkable, that in the kindred disease, which Hoffmann and Sauvage call the atrophy of infants, we have many of the same symptoms and the same appearances nearly after death. "They who perish by this disease," says Hoffmann, "have the mesenteric glands enlarged and scirrhous; the liver and spleen obstructed and increased in size; the intestines are much inflated, and are loaded with black and fœtid matters, and the muscles, more especially of the abdomen, waste away."

RACHORE, or ADONI-RACHORE, a city of the peninsula of Hindustan, capital of a district of the same name, subject to the nizam of the Deccan. It is seated on the south bank of the Kistna, near its confluence with the Tungebadra, 315 miles N. by E. of Seringapatam. Lon. 78. 15 E. Lat. 16. 30 N.

RACINE (John), a French poet born at Ferté-Milon, 1639. He was educated at Port Royal, where he made a rapid progress in Greek and Latin, and showed great fondness for the sublime compositions of Euripides and Sophocles. He afterwards went to Paris, where he celebrated the king's marriage; and so popular was his nymphe de la Seine, on this occasion, that the courtiers were full of his praises, and the monarch settled on him a pension. He, in 1666, produced his Alexandria, and about this time was engaged in a controversy with Nicole, of the Port Royal. In 1668 he produced his Plaideurs, a comedy, and Andromache, a tragedy; and in 1670 appeared Britannicus, Berenice in 1671, Bajazet in 1672, Mithridates in 1673, Iphigenia in 1675, and Phædra in 1677. These were represented with increased applause; but a cabal was raised against the poet, and Pradon, a writer of little capacity, was prevailed upon to produce a Phædra to oppose the noble composition of Racine. This hurt the feelings of the poet, and strongly alive to the violence of persecution, he formed a design of becoming a Carthusian friar. He had formerly worn the ecclesiastical habit at the Port Royal, but his confessor expostulated with him, and prevailed upon him to marry, and thus instead of bidding adieu to the world, to become one of its most useful members. He thus became father of seven children; but soon after determined never to write for the theatre, and he was reconciled to the Port Royal, and all those whom satire or jocularity had made his enemies. In spite, however, of his resolutions,

he was prevailed upon by madame Maintenon to write a sacred tragedy for her young ladies at St. Cyr, and this produced Esther, and afterwards Athalie. He was, in 1673, admitted member of the French academy, and in 1677 he was employed with Boileau to write the history of Lewis XIV.; but the work was never completed. Racine afterwards drew up the history of the Port Royal, 2 vols. 12mo. His excessive sensibility at last proved the cause of his death. He wrote a memorial on the miseries of the poor, which he lent to madame Maintenon, but it fell accidentally into the hands of the king, who expressed his dissatisfaction. Racine heard of the royal displeasure, and was so terrified that he fell into a fever, and the disorder at last proved fatal. He died 1699. A pension was honourably settled by the king on his family. He wrote besides, canticles or hymns, for the use of St. Cyr—letters and epigrams, &c. He has often been compared to Corneille, and Perrault observes, that if Corneille surpassed Racine in heroic sentiments and the grand character of his personages, he was inferior to him in moving the passions, and in purity of language.

Racine (Lewis), son of the poet, received a civil appointment, by Fleury. He died 1763, aged 71. He was himself a poet of considerable merit, and besides poems, wrote reflections on poetry—the life of his father, 2 vols.—a prose translation of Milton's paradise lost, and other works.

RA'CINESS. *s.* (from *racy.*) The quality of being racy.

RACK. *s.* (*racke*, Dutch; from *racken*, to stretch.) 1. An engine to torture (*Taylor*). 2. Torture; extreme pain (*Temple*). 3. Any instrument by which extension is performed (*Wilkins*). 4. A distaff: commonly spoken and written *rock* (*Dryden*). 5. The clouds as they are driven by the wind (*Shakspeare*). 6. (*racca*, Islandic, hinges or joints.) A neck of mutton cut for the table. 7. A grate; the grate on which bacon is laid. 8. A wooden grate in which hay is placed for cattle (*Mort.*). 9. Arrack; a spirituous liquor.

Rack, in a stable, the railed convenience constructed above the manger, for the reception of the hay. It should be so formed, as to have openings at the bottom, for the dust and seeds to pass through: and although it has become of late a practice exceedingly prevalent, to have the rack on one side, instead of in the center of the stall, no good or rational plea can be advanced in justification of such novelty: on the contrary, it compulsively accustoms the horse to stand with his hind-quarters mostly on one side of the stall, by which his bedding is constantly and inevitably deranged almost as soon as it is set fair.

Rack (Edmund), of Ellingham, Norfolk, from a spinning boy, became the menial servant, and afterwards the apprentice of a woollen draper. In 1758, he settled at Bradford, Essex, in business for himself, and afterwards retired to Bath, master of an honourable competency. He here established the agricultural society, to which he became secretary. Though a quaker, he wrote the ruins of an ancient cathedral, a poem—a volume of poems—Mentor's letters—poems and essays, 1781, &c. and died 1787, aged 52.

To Rack. *v. n.* (from the noun.) To stream as clouds before the wind (*Shakspeare*).

To Rack. *v. a.* (from the noun.) 1. To torment by the rack (*Dryden*). 2. To torment; to harass (*Milton*). 3. To harass by exaction (*Spenser*). 4. To screw; to force to performance (*Tillotson*). 5. To stretch; to extend (*Shakspeare*). 6. To defecate; to draw off from the lees (*Bacon*).

Rack-rent. *s.* (*rack* and *rent.*) Rent raised to the uttermost (*Swift*).

Rack-renter. *s.* (*rack* and *renter.*) One who pays the uttermost rent (*Locke*).

RACKERSBURG, a strong town of Austria, in Stiria, with a castle on a mountain. It is seated on an island, formed by the Muehr, 22 miles S.E. of Gratz, and 100 S. of Vienna. Lon. 15. 58 E. Lat. 46. 54 N.

RA'CKET. *s.* 1. An irregular clattering noise (*Shakspeare*). 2. A confused talk, in burlesque language (*Swift*). 3. The instrument with which players strike the ball (*Digby*).

RA'CKING. *s. Racking* pace of a horse is the same as an amble, only that it is a swifter time and a shorter tread (*Farrier's Dict.*).

RACLE (Leonard), an architect, born at Dijon. He joined the Reyssouze to the Saone, built the harbour of Versoix, and in 1786 obtained the prize of the Toulouse academy, by his memoir on the erection of an iron bridge of a single arch of 400 feet span. He was the friend of Voltaire, and built his house at Ferney. He declined the liberal offers of Catharine of Russia, and died at Pont-de-Vaux, 1792. He wrote besides, memoirs on the property of the cycloid—on regulating the course of the Rhone and the Ain, &c.

RACONI, a populous town of Piedmont, which belongs to the prince of Carignano, who has a castle here. It is seated in a plain, on the rivers Grana and Macra, six miles S. of Carignano. Lon. 7. 46 E. Lat. 44. 39 N.

RACOSIS. (ῥακωσις; from ῥακος, a rag.) A ragged excoriation of the relaxed scrotum.

RA'CY. *a.* Strong; flavourous; tasting of the soil (*Cowley*).

RAD. The old pret. of *read* (*Spenser*).

Rad, *red*, and *rod*, differing only in dialect, signify counsel; as Conrad, powerful or skilful in counsel; Ethelred, a noble counsellor (*Gibson*).

RADCLIFFE (Dr. John), an English physician of great eminence in his time, born at Wakefield in Yorkshire in 1650. He was educated at Oxford, and enrolled himself upon the physical line; but it was remarkable that he recommended himself more by his ready wit and vivacity, than by any extraordinary acquisitions in learning. He began to practise at Oxford in 1675; but never paid any regard to established rules, which he censured whenever he thought fit, with great freedom

and acrimony; and as this drew all the old practitioners upon him, he lived in a continual state of hostility with them. Nevertheless, his reputation increased with his experience; so that, before he had been two years in business, his practice was very extensive among persons of high rank. In 1684, he removed to London, and settled in Bow-street, Covent Garden, where in less than a year he got into excellent business.—In 1687 the princess Anne of Denmark made him her physician: yet when her husband and she joined the prince of Orange, Radcliffe, either not choosing to declare himself, or unwilling to favour the measures then in agitation, excused himself from attending them, on the plea of the multitude of his patients. Nevertheless, he was often sent for to king William and other great personages, though he did not incline to be a courtier. He incurred some censure for his treatment of queen Mary, who died of the small-pox; and soon after lost his place about the princess Anne, by his attachment to his bottle. He also totally lost the favour of king William by his uncourtly freedom; for, in 1699, when the king showed him his swollen ancles, while the rest of his body was emaciated, and asked him what he thought of them? "Why truly I would not have your majesty's two legs for your three kingdoms," replied Radcliffe. He continued increasing in business and insolence as long as he lived, continually at war with his brethren the physicians; who considered him in no other light than that of an active ingenious empiric, whom constant practice had at length brought to some degree of skill in his profession. He died in 1714; and, if he never attempted to write any thing himself, has perpetuated his memory by founding a fine library at Oxford, to preserve the writings of other men.

RADDOCK, or REDBREAST. See MOTACILLA.

RADIAL ARTERY. Arteria radialis. A branch of the humeral artery, that runs down the side of the radius.

RADIALIS EXTERNUS BREVIOR. In anatomy. See EXTENSOR CARPI RADIALIS BREVIOR.

R. EXTERNUS LONGIOR. See EXTENSOR CARPI RADIALIS LONGIOR.

R. EXTERNUS PRIMUS. See EXTENSOR CARPI RADIALIS LONGIOR.

R. INTERNUS. See FLEXOR CARPI RADIALIS.

R. SECUNDUS. See EXTENSOR CARPI RADIALIS BREVIOR.

RA'DIANCE. RA'DIANCY. *s.* (*radiare*, Lat.) Sparkling lustre; glitter (*Brown*).

RA'DIANT. *a.* (*radians*, Latin.) Shining; brightly sparkling; emitting rays (*Milton*).

To RA'DIATE. *v. n.* (*radio*, Latin.) To emit rays; to shine; to sparkle (*Boyle*).

RADIATE COROL, or FLOWER. (*radius*, a ray.) Corol radiatus flos. A rayed corolla or flower.—A kind of compound flower, (in the class syngenesia) consisting of a disk, in which the corollets or florets are tubular and regular; and of a ray, in which the florets are irregular. These are most commonly ligulate: as in sunflower, daisy, &c.—Sometimes, however, they also are tubular, but irregular; as in centaurea. And sometimes they are naked, or nearly so: as in artemisia, gnaphalium.

RA'DIATED. *a.* (*radiatus*, Lat.) Adorned with rays (*Addison*).

RADIATO-PATENT, in botany. Radiate-expanding: or, spreading out like rays. Applied to the stigma.

RADIA'TION. *s.* (*radiatio*, Latin.) 1. Beamy lustre; emission of rays (*Bacon*). 2. Emission from a centre every way (*Bacon*).

RA'DICAL. *a.* (*radical*, French.) 1. Primitive; original (*Bentley*). 2. Implanted by nature (*Wilkins*). 3. Serving to origination.

RADICAL VINEGAR, in chemistry. When acetate of copper, reduced to powder, is put into a retort and distilled, there comes over a liquid at first nearly colourless and almost insipid, and afterwards a highly concentrated acid. The distillation is to be continued till the bottom of the retort is red hot. What remains in it then is only a powder of the colour of copper. The acid product, which should be received in a vessel by itself, is tinged green by a little copper which passes along with it; but when distilled over again in a gentle heat, it is obtained perfectly colourless and transparent. The acid thus obtained is exceeding pungent and concentrated. It was formerly distinguished by the names of radical vinegar, and vinegar of Venus; it has since been found to be acetous acid combined with a new dose of oxygen, and is called acetic acid.

RADICA'LITY. *s.* (from *radical.*) Origination (*Brown*).

RA'DICALLY. *ad.* (from *radical.*) Originally; primitively (*Prior*).

RA'DICALNESS. *s.* (from *radical.*) The state of being radical.

RADICANT STEM, in botany. A rooting stem. Altis se affigens radiculis lateralibus.—Radicant leaf. Si folium radices agat. See ROOTING.

RADICATE LEAF, in botany. A rooted leaf. Radiculas demittens e substantia ipsius folii.—Radicate scape, a rooted scape, as in drosera.

To RA'DICATE. *v. a.* (*radicatus*, Latin.) To root; to plant deeply and firmly (*Hammond*).

RADICA'TION. *s.* (from *radicate.*) The act of taking root and fixing deep (*Hammond*).

RA'DICLE. *s.* (*radicule*, Fr.) That part in a seed which forms the root (*Quincy*).

RADICULA. A small root or radicle. A term sometimes applied by anatomists to express the smaller origin of some nerves. The common horse-radish is sometimes thus denominated.

RADIMPOUR, or RADUNPOUR, a town of Hindustan, in the province of Agimere, situate on the Puddar, 175 miles N. of Surat, and 250 S.W. of Agimere. Lon. 71. 48 E. Lat. 23. 58 N.

RADIOLA, in botany, a genus of the class tetrandria, order tretragynia. Calyx many-cleft; petals four; capsule superior, eight-valved, eight-celled; seeds solitary. One species; indigenous to the wet sandy wastes of our own country. It is the linum radiola of Linnæus; but properly separated, and formed into a distinct genus by Dr. E. Smith.

RADISH, in botany. See RAPHANUS.

RADISH (Black Spanish). See RAPHANUS.

RADISH (Horse). See COCHLEARIA.

RADISH (Turnip). See RAPHANUS.

RADIUS, in geometry, the semidiameter of a circle; or a right line drawn from the centre to the circumference.—It is implied in the definition of a circle, and it is apparent from its construction, that all the radii of the same circle are equal.—The radius is sometimes called, in trigonometry, the sinus totus, or whole sine. The length of the radius of any circle, is equal to that of an arc of 57·2957795 degrees of the same circle.

RADIUS, in the higher geometry. *Radius of the evoluta, radius osculi,* called also the *radius of concavity,* and the *radius of curvature,* is the radius of a circle having the same curvature, in a given point of the curve, with that of the curve in that point. See CURVATURE, CURVE, and EVOLUTE.

RADIUS, in optics. See RAY.

RADIUS VECTOR, is used for a right line drawn from the centre of force in any curve in which a body is supposed to move by a centripetal force, to that point of the curve where the body is supposed to be. In the elliptical orbit of a planet, let $a =$ semiaxis major, $ae =$ distance from the centre to the focus, or $e =$ eccentricity to semiaxis major $= 1$, $v =$ true anomaly, and $u =$ eccentric anomaly, then the radius vector r is expressed by either of the following formulæ $r = a\ (1 + e \cos. u)$, or $r = \frac{a\ (1 - e^2)}{1 - e \cos. v}$.

RADIUS. (*radius,* a staff or beam; so called from its resemblance.) This bone has gotten its name from its supposed resemblance to the spoke of a wheel, or to a weaver's beam; and sometimes, from its supporting the hand, it has been called manubrium manus. Like the ulna, it is of a triangular figure, but it differs from that bone, in growing larger as it descends, so that its smaller part answers to the larger part of the ulna, and vice versa. Of its two extremities, the uppermost and smallest is formed into a small rounded head, furnished with cartilage, and hollowed at its summit, for an articulation with the little head at the side of the pulley of the os humeri. The round border of this head, next the ulna, is formed for an articulation with the lesser sygmoid cavity of that bone. This little head of the radius is supported by a neck, at the bottom of which, laterally, is a considerable tuberosity, into the posterior half of which is inserted the posterior tendon of the biceps, while the anterior half is covered with cartilage, and surrounded with a capsular ligament, so as to allow this tendon to slide upon it as upon a pulley. Immediately below this tuberosity, the body of the bone may be said to begin. We find it slightly curved throughout its whole length, by which means a greater space is formed for the lodgment of muscles, and it is enabled to cross the ulna without compressing them. Of the three surfaces, to be distinguished on the body of the bone, the external and internal ones are the broadest and flattest. The anterior surface is narrower and more convex. Of its angles, the external and internal ones are rounded; but the posterior angle, which is turned towards the ulna, is formed into a sharp spine, which serves for the attachment of the interosseous ligament, of which mention is made in the description of the ulna. This strong ligament, which is a little interrupted above and below, serves not only to connect the bones of the fore-arm to each other, but likewise to afford a greater surface for the lodgment of muscles. On the fore part of the bone, and at about one third of its length, from its upper end, we observe a channel for vessels, slanting obliquely upwards. Towards its lower extremity, the radius becomes broader, of an irregular shape, and somewhat flattened, affording three surfaces, of which the posterior one is the smallest; the second, which is a continuation of the internal surface of the body of the bone, is broader and flatter than the first; and the third, which is the broadest of the three, answers to the anterior and external surface of the body of the bone. On this last we observe several sinuosities, covered with a thin layer of cartilage, upon which slide the tendons of several muscles of the wrist and fingers. The lowest part of the bone is formed into an oblong articulating cavity, divided into two by a slight transverse rising. This cavity is formed for an articulation with the bones of the wrist. Towards the anterior and convex surface of the bone, this cavity is defended by a remarkable eminence, called the styloid process of the radius, which is covered with a cartilage that is extended to the lower extremity of the ulna; a ligament is likewise stretched from it to the wrist. Besides this large cavity, the radius has another much smaller one, opposite its styloid process, which is lined with cartilage, and receives the rounded surface of the ulna. The articulation of the radius with the lesser sygmoid cavity of the ulna is strengthened by a circular ligament, which is attached to the two extremities of that cavity, and from thence surrounds the head of the radius. This ligament is narrowest, but thickest at its middle part. But, besides this ligament, which connects the two bones of the fore arm with each other, the ligaments which secure the articulation of the radius with the os humeri are common both to it and to the ulna, and therefore cannot well be understood till both these bones are described. These ligaments are a capsular and two lateral ligaments. The capsular ligament is attached to the anterior and posterior surfaces of the lower extremity of the os humeri, to the upper edges and sides of the cavi-

ties we remarked at the bottom of the pulley and little head, and likewise to some part of the condyles: from thence it is spread over the ulna, to the edges of the greater sygmoid cavity, so as to include in it the end of olecranon and of the coronoid process; and is likewise fixed round the neck of the radius, so as to include the head of that bone within it. The lateral ligaments may be distinguished into external and internal, or according to Winslow, into brachio radialis, and brachio cubitalis. They both descend laterally from the lowest part of each condyle of the os humeri, and, from their fibres spreading wide as they descend, have been compared to a goose's foot. The internal ligament, or brachio cubitalis, which is the longest and thickest of the two, is attached to the coronoid process of the ulna. The external ligament, or brachio radialis, terminates in the circular ligament of the radius. Both these ligaments adhere firmly to the capsular ligament, and to the tendons of some of the adjacent muscles. In considering the articulation of the fore-arm with the os humeri, we find that when both the bones are moved together upon the os humeri, the motion of the ulna upon the pulley allows only of flexion and extension; whereas, when the palm of the hand is turned downwards or upwards, or in other words, in pronation and supination, we see the radius moving upon its axis, and in these motions its head turns upon the little head of the os humeri at the side of the pulley, while its circular edge rolls in the lesser sygmoid cavity of the ulna. At the lower end of the fore-arm the edge of the ulna is received into a superficial cavity at the side of the radius. This articulation, which is surrounded by a loose capsular ligament, concurs with the articulation above, in enabling the radius to turn with great facility upon its axis; and it is chiefly with the assistance of this bone that we are enabled to turn the palm of the hand upwards or downwards, the ulna having but a very inconsiderable share in these motions.

RADIX, or ROOT, is a certain finite expression or function, which, being evolved or expanded according to the rules proper to its form, shall produce a series. That finite expression, or radix, is also the value of the infinite series. So $\frac{1}{3}$ is the radix of ·3333 &c. because $\frac{1}{3}$ being evolved or expanded, by dividing 1 by 3, gives the infinite series ·3333 &c. In like manner, the radix

of $1 - r + r^2 - r^3 + r^4$ &c. is $\frac{1}{1+r}$,

of $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16}$ &c is $\frac{1}{1+\frac{1}{2}}$,

of $1 - 1 + 1 - 1 + 1$ &c is $\frac{1}{1+1}$,

of $1 - 2 + 4 - 8 + 16$ &c is $\frac{1}{1+2}$,

of $\frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \frac{1}{16} + \frac{1}{32}$ &c is $\frac{1}{2+1}$,

of $1 + x + x^2 + x^3 + x^4$ &c is $\frac{1}{1+x}$,

of $1 + 2x + 3x^2 + 4x^3$ &c is $\frac{1}{(1-x)^2}$,

of $1 + \frac{x^2}{2} + \frac{3x^4}{8} + \frac{5x^6}{16}$ &c is $\sqrt{\frac{1}{1-x^2}}$.

See Dr. Hutton's 4to Tracts, vol. i. pa. 9, 31.

RADIX, in botany. (from *radius*, according to some; from *rado*, as others will have it; but more probably from the Greek ῥαδιξ, which however signifies a branch.) Alimentum hauriens, herbamque cum fructificatione producens. Philos. Bot.—Organon nutriens plantam. Delin. Pl.—Descendens, aquosa sorbens, nutriens. Regn. Veg. See ROOT.

RADNOR (New), a borough of Wales, in Radnorshire, with a market on Thursday. It is nominally the county-town, though a small place, and the assizes are held at Presteign. Three miles E. of it is Old Radnor, said to have been the Magoth of Antoninus, but now an insignificant village. New Radnor is seated near the source of the Somergil, at the foot of a hill, on which a castle formerly stood, 24 miles N.W. of Hereford, and 159 W.N.W. of London. Lon. 2. 45 W. Lat. 52. 10 N.

RADNORSHIRE, a county of Wales, 30 miles long and 25 broad; bounded on the E. by Shropshire and Herefordshire, N. by Montgomeryshire, N.W. by Cardiganshire, and S.W. and S. by Brecknockshire. It contains 326,400 acres, is divided into six hundreds, and 52 parishes; has four market-towns; and sends two members to parliament. The number of inhabitants in 1801 was 19,050. Its principal rivers are the Wye and Tend, the former dividing it from Brecknockshire, and the latter from Shropshire. The E. and S. parts are tolerably level and productive of corn. The other parts are rude and mountainous; devoted chiefly to the rearing of cattle and sheep.

RADSTADT, a town of Bavaria, in the duchy of Salzburg, near the source of the Ens, 35 miles E.S.E. of Salzburg. Lon. 13. 26 E. Lat. 47. 18 N.

To RAFF. *v. a.* To sweep; to huddle; to take hastily without distinction (*Carew*).

To RA'FFLE. *v. n.* (*raffler*, to snatch, Fr.) To cast dice for a prize (*Tatler*).

RA'FFLE. *s.* (*raffle*, Fr.) A species of game or lottery, in which many stake a small part of the value of some single thing, in consideration of a chance to gain it (*Arbuthnot*).

RAFNIA, in botany, a genus of the class diadelphia, order decandria. Calyx ringent; the upper lip bifid; lower lip divaricately trifid, with the middle tooth narrower; legume lanceolate, compressed. Fourteen species; all Cape plants except rafnia perfoliata, which is a native of Carolina.

RAFT, a sort of float, formed by an assemblage of various planks or pieces of timbe, fastened together side by side, so as to be cor-

veyed more commodiously to any short distance in a harbour or road than if they were separate. The timber and plank, with which merchant ships are laden, in the different parts of the Baltic, are attached together in this manner, in order to float them off to the shipping.

RAFT. part. pass. of *raff*. Torn; rent (*Spenser*).

RAFTERS, in architecture, are pieces of timber which stand by pairs on the raising-piece, or wall plate, and meet in an angle at the top, forming the roof of a building.

RA'FTERED. *a.* (from *rafter*.) Built with rafters (*Pope*).

RAG. *s.* (hnaccoꝺ, torn, Saxon.) 1. A piece of cloth torn from the rest; a tatter (*Milton*). 2. Any thing rent and tattered; worn out clothes (*Sandys*). 3. A fragment of dress (*Hudibras*).

RAGAMU'FFIN. *s.* A paltry mean fellow.

RAGE. *s.* (*rage*, French.) 1. Violent anger; vehement fury (*Shakspeare*). 2. Vehemence or exacerbation of any thing painful (*Bacon*). 3. Enthusiasm; rapture (*Cowley*). 4. Eagerness; vehemence of mind (*Pope*).

To RAGE. *v n.* (from the noun.) 1. To be in fury; to be heated with excessive anger (*Milton*). 2. To ravage; to exercise fury (*Wal.*). 3. To act with mischievous impetuosity (*Milton*).

RA'GEFUL. *a.* (*rage* and *full*.) Furious; violent (*Hammond*).

RAGG (Rowley). See RAGGSTONE.

RA'GGED. *a.* (from *rag*.) 1. Rent into tatters (*Arbuthnot*). 2. Uneven; consisting of parts almost disunited (*Shakspeare*). 3. Dressed in tatters (*Dryden*). 4. Rugged; not smooth (*L'Estrange*).

RAGGED ROBIN, in botany. See LYCHNIS.

RA'GGEDNESS. *s.* (from *ragged*.) State of being dressed in tatters (*Shakspeare*).

RA'GINGLY. *ad.* (from *raging*.) With vehement fury.

RAGLAND, a village in Monmouthshire, five miles N.E. of Usk. It is famous for its castle, where Charles I. passed much of his time, and lived in a magnificent style. This castle was the last in Cromwell's time, which surrendered to general Fairfax.

RAGMAN, one who deals in rags.

RAGOT, a name given in the old manage, to a horse that has short legs, a broad croup, and a strong thick body. It differs from a goussaut in this, that the latter has more shoulders, and a thicker neck.

RA'GOUT. *s.* (French.) Meat stewed and highly seasoned (*Addison*).

RAGG-STONE, ROWLEY-RAGG, in mineralogy, a variety of trap, or basalt, by Kirwan denominated turilite; of a black colour with numerous white dots and black lamellæ of basaltine, which give it a dark brownish-grey appearance. It is found in large masses, affecting a rhomboidal form, inclosing rounded pebbles of the same substance: it acquires an ochry crust by exposure to the air, and shines internally from a number of minute particles. Heated in the open air it becomes magnetic, and loses about 3 per cent of its weight. It does not redden in the fire, but at 98° melts into a porous black mass, partly porcelane, partly enamel; its fracture is nearly even, and fine-splintery, often inclining to a conchoidal line. It contains

Silica - - - -	475
Alumina - - -	325
Oxyd of iron - - -	200
	1,000.

It is sometimes found composed of trap and crystals of quartz in various parts of England, and has some resemblance to porphyry. This is particularly the case about Newcastle, where the hills contain large beds of it.

RAGULED, in heraldry, differs from *indented*, in that the latter is regular, the former not.

RAGUSA, a town of Sicily, in Val di Noto, near the river Maulo, 18 miles W.N.W. of Noto.

RAGUSA, a city and seaport of Dalmatia, capital of Ragusen, and an archbishop's see. It is two miles in circumference, and strong by situation, having an inaccessible mountain on the land side, and a strong fort on the gulf of Venice. It has a considerable trade with the Turks, and is 66 miles W. of Scutari. Lon. 17. 55 E. Lat. 42. 32 N.

RAGUSEN, a territory of Dalmatia, lying along the coast of the gulf of Venice, about 55 miles long and 20 broad. It was a republic, under the protection of the Turks and Venetians; but now is annexed to Italy. The soil is so barren, that the inhabitants receive the greatest part of their necessaries from the neighbouring islands and Turkish provinces. The Ragusians profess the Roman catholic religion, but the Greek, Armenian, and Turkish persuasions are tolerated for conveniency. Ragusa is the capital.

RAGWORT, in botany. See SENECIO.

RAGWORT (Sea), in botany. See CINERARIA.

RAGWORT (African), in botany. See OTHONNA.

RAIA. Ray. In zoology, a genus of the class pisces, order chondropterigia. Spiracles five on each side, oblique, placed beneath near the neck; head small, pointed, not distinct from the body; mouth beneath, transverse, toothed; body broad, thin, flat. Nineteen species, thus divided into sections.

A. Teeth sharp, comprising the skates and electric ray, or torpedo.

B. Teeth obtuse, comprising the sting-ray and thornbacks.

C. Uncertain, comprising five species, that inhabit the Red Sea, or around the Cape of Good Hope, and which have not yet been sufficiently examined.

All these are inhabitants of the sea only: they keep at the bottom, and in winter cover themselves with mud or sand; they feed on testaceous animals, fishes, or any animal substances they meet with; grow to a large size, sometimes exceeding two hundred pounds weight; the females are the larger, and produce their young alive, only one at a time, though others are successively extruded a few hours after, and these, like the young of the shark, are inclosed in a quadrangular, black, horny shell, the corners of which end in slender incurved points, but not extending into long filaments like those of the shark; eyes half covered with a thin membrane, oblong, placed on the upper part of the head; above these, in the place of nostrils, is a broad sulcus, or groove, divided by a reticulate membrane, consisting of crested folds, and closed with a valve; behind this sulcus are two semilunar orifices; tongue very broad, short, smooth; pectoral fins covered with a thick skin, and surrounding the body; ventral at the base, and connected with the anal; flesh generally eatable; liver large, and producing a great quantity of pure oil.

The following are the chief species.

1. R. batis. Skate. Varied; middle of the back smooth; tail with a single row of spines. Inhabits the European ocean, and is the largest of its genus: body above cinereous, sometimes with a few black lines, beneath white, with waved lines of black dots; round the eyes are numerous small, hooked spines; in the males the fins are full of spines.

Of all the larger fishes the skates are the most numerous; and their numbers are in a great measure owing to their size, and to the protection of those frightful spines which nature has afforded them. There is none of the rapacious tribes, except, perhaps, the cachalot and white shark, that has a swallow sufficiently large to receive them; and even these are, probably, often deterred from their purposes of destruction by the armour with which their prey is covered. Of some the size is such as to defy all the powers of destruction which even the shark himself is known to possess. In England some have been taken upwards of two hundred pounds weight; but even this is far inferior to their enormous bulk in other parts of the world. Near the island of Guadaloupe in the West Indies, a ray was killed, thirteen feet eight inches in breadth, and twenty-five from the snout to the tip of the tail. This last member contributed largely however to so prodigious a dimension; for it was twenty inches broad at its insertion, and tapered to a point, by which it terminated fifteen feet behind the body of the animal.

The fishes of this tribe probably attain a much larger size than that of any individual which has ever yet been examined. It is only the smallest of the kind that approach the shores; the larger continue for ever prowling at the bottom in the unfathomable caverns of the ocean, where they continue perhaps to grow for a century. Hence the utmost bulks of this tribe of rays cannot be ascertained, and some zoologists have supposed them to be the largest inhabitants of the sea. When, however, they surpass the common size, they become too coarse for food; though even in such state the negroes and half-starved savages of America cut them up for this purpose, and esteem their tenderer parts, when salted, as delicious morsels.

These fishes generate in March and April, at which time they swim near the surface of the water, several males pursuing one female. The females cast their purses as the fishermen call it in May, and continue to produce till September: they are very prolific, not less than three hundred eggs having been found in the body of a single female. In October, when their parturition ceases, they are exceedingly poor; after which they improve gradually during the winter and spring, till May, when they are at their highest perfection, and again begin to undergo the same process of increase.

The rays generally frequent those parts of the sea where the bottom is black and muddy, where their voracity leads them indiscriminately to devour every animal which they can surprise: but although their appetite is ravenous and indiscriminate, they become more delicate with regard to a baited hook; they devour below any putrid substance whatever, but if the bait have been taken up and suffered to lie for any time in the open air, they will not touch it: they appear by their manner to perceive the line, and to dread it; but the impulse of their hunger is too great for their caution, and, even though they perceive the danger, if thoroughly hungry, they devour, as if regardless of destruction.

Both English and Dutch carry on the fishing to a considerable extent: the season at which they begin is early in the winter; and the boats in which the fishermen put to sea are of different sizes, according to the distance of the place where they intend to fish. The vessels used in the British Channel, called cobles, are of one ton burden, rowed with three pair of oars, and admirably constructed for encountering a mountain sea. When they go out to fish, every person is provided with three lines; each man's lines are fairly coiled upon a flat oblong piece of wicker-work, the hooks being baited, and placed very regularly in the centre of the coil. Each line is furnished with two hundred and eighty hooks, at the distance of six feet two inches from each other; the hooks are fastened to lines of twisted horse-hair, twenty-seven inches in length.

When fishing, there are always three men in each coble, and consequently nine of these lines are fastened together, and used as one line, extending in length near three miles, and furnished with above two thousand five hundred hooks; an anchor and buoy are fixed at the first end of the line, and another at the end of every other line; in all, four anchors, and four buoys, made of leather or cork.

The line is always laid across the currents; the tides of flood and ebb continue an equal time upon our coast; and, where undisturbed

by winds, run each way about six hours; they are so rapid, that the fishermen can only shoot and haul their lines at the turn of the tide; and, therefore, the lines always remain upon the ground six hours; the same rapidity of tide prevents them from using hand lines, and, therefore, two of the people commonly wrap themselves up in the sail, and sleep, while the other keeps a strict look out, for fear of being run down by ships, and to observe the weather; for storms often rise so suddenly, that it is sometimes with extreme difficulty they escape to the shore, though they leave the lines behind them.

Such is the account which M. Pennant gives of the manner in which the taking of these fish is conducted in the channel; but there are annually larger vessels, of twenty-five tons burden, that repair at the time of Lent to the Dogger Bank, where they fish for turbot, cod, ling, and skates indiscriminately, and where the business is carried on in a more expeditious manner, for as the fishermen have no occasion to wait the returns of the tide, each takes along with him twice the number of lines, which he continues to bait, haul, and shoot, without interruption.

But this method of fishing, operose as it may seem, and this extent of line, though it runs three miles along the bottom, is trifling when compared to the exertions made in the Mediterranean by the Italian fishers: there they go to sea in a tartan, a vessel much larger than ours; and bait a line of no less than twenty miles long, with above ten thousand hooks. This line is called the parisina; and the mode of fishing is named pielago. A piece of tackle of such enormous length, it is impossible to haul and shoot in the same space with the English lines: it remains for a considerable period in the sea, and cannot be taken up in less than twenty-four hours. By this apparatus, they not only take rays, but sharks and other large fishes; some of them above a thousand pounds weight. When a fish of this magnitude is found at the line, the men are provided with an harpoon to dispatch them before they are brought on board.

2. R. oxyrinchus. Sharp-nosed skate. Varied; middle of the back with ten spinous tubercles.

Willoughby describes this species, which he examined at Rome in 1664. They are frequently taken on the British coasts; and are distinguished from the former by their long, narrow, and sharp-pointed snout, not unlike the end of a spontoon. The mouth is very large, and furnished with a number of small sharp teeth, bending inwards: the tail is thick, and terminates in two small fins. The whole fish seven feet long.

This is supposed to be the bos of the ancient naturalists, a fish they describe as of an enormous size. Oppian gives an account of its fondness for human flesh, and the method it takes of destroying men, by overlaying them, and keeping them down with its vast weight till they are drowned. Other writers give the same relation, and confirm the character of these anthropophagi. In the south they are so well known, that the persons employed in the pearl fishing have learned from the fatal experience of many of their own body how much they ought to be guarded against. These unhappy divers are sometimes surrounded, and wrapped round by the fins of the manta, for so this animal is by the pearl-fishers called, till they are suffocated: the negroes, therefore, take care never to go down without a sharp knife to defend themselves against so terrible an enemy.

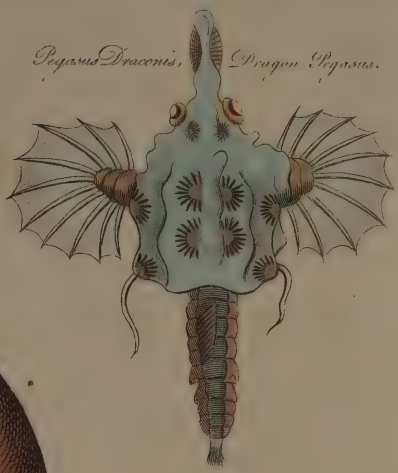
3. R. torpedo. Torpedo, or electric ray. Body entirely smooth, flat. This species inhabits our own and the Mediterranean seas, and grows to a large size, some weighing not less than eighty pounds, though the usual weight is not more than twenty: its colour is a dirty clay; the head and body are round, and but indistinctly separated; the latter extremely thin, and attenuated towards the edges. Behind the eyes are two wide foramina, which Willoughby supposes are intended for conveying sound: they are beset with six cutaneous fingers on their inner circumference, and communicate with the mouth.

The torpedo can live only twenty-four hours out of the sea, and but little longer if put into fresh water; it inhabits those places where the bottom is sandy, and buries itself superficially by flinging the sand over its back with a vibration it gives to its extremities. It is in this concealed situation that the torpedo astonishes the unwary passenger, who inadvertently treads upon it, by the exertion of a faculty perhaps the most extraordinary in nature.

The narcotic power of this animal has been taken notice of in all ages; the instant the fish is touched it benumbs the arm, and sometimes the whole body of him who touches it. The same effect is produced even when it is touched with a stick, or trodden upon by a person who has his shoes on. Oppian stretches the matter probably too far, when he alleges that it will benumb the fisherman through the whole length of the line and the rod.

The shock given by this animal most nearly resembles that of an electrical machine; it is sudden, tingling, and painful. It is thus described by Kempfer: "The instant I touched it with my hand I felt a terrible numbness in my arm, as far up as the shoulder. Those who touch it with the foot are seized with a stronger palpitation than those who apply the hand to it. This numbness bears no resemblance to that which we feel when the vein has been a long time pressed, and the foot is said to be asleep; it rather appears like a sudden vapour, which, passing through the pores in an instant, penetrates into the very spring of life, whence it diffuses itself over the whole body, and at the same time gives real pain; the nerves are so affected, that the person struck imagines all the bones of his body, particularly those of the limb that received the blow, are driven out of joint; all this is accompanied with an universal tremor, a sickness

Pegasus Draconis, Dragon Pegasus.



Raia Torpedo, Torpedo Ray.





Syngnathus Hippocampus
or
Sea Horse Pipefish.

London, Published by Sherwood & Co. Paternoster Row, May 1st 1812.

of the stomach, a general convulsion, and a total suspension of the faculties of the mind: in short, such is the pain, that all the force of our promises and authority could not prevail upon a seaman to undergo the shock a second time."

The aura which the torpedo discharges, and which produces effects so violent and instantaneous upon the human frame, is sufficiently proved to be electric; but by what means the animal so readily secretes it no naturalist has been able to explain. Great, however, as its powers are when the animal is in vigour, they are impaired as he declines in strength, and totally cease when he expires; they impart no noxious qualities to the fish, when used as food; for the French, who find it plentifully on their coasts, very commonly dress and eat it.

This narcotic power is serviceable to the animal in two important respects; as a means of defence against voracious fishes, and as a method of procuring subsistence from among the smaller tribes; for the former, when electrified, are deprived of all possibility of seizing their prey; and the latter, after having unwarily approached the torpedo, and received the shock, are incapable of making their escape.

The food of the torpedo is surmullets and plaise; the former are so swift, that it is impossible for the torpedo to take them by pursuit: and as this fish has been found in its stomach, it justifies Pliny's account of the manner in which this animal secures its prey. The torpedo is taken at Torbay, off Pembroke, and at Waterford in Ireland; it is caught like other flat fish, with the trawl, and is commonly found in water forty fathom deep, in company with other rays.

4. R. pastinaca. Sting-ray, or fire-flare. Body smooth; tail with a long sharp spine, serrate on the fore part, and another on the back. Two other varieties, one with two spines, both serrate on the fore-part; the other with the body spotted.

Were we to credit all the marvellous accounts which the ancient naturalists have given of the venom lodged in the armour of this fish, we would unavoidably dread it, as an animal still more formidable than the torpedo. The weapon in which nature is said to have lodged this poison grows like a spine from the tail; it is about five inches long, and about four inches behind the body. According to the fables of Pliny, the venom is so potent as to affect even the inanimate creation. Trees that are struck with it instantly lose their verdure, and rocks themselves are incapable of resisting this powerful virus. It was with the spine of the trygon, or fire-flare, that the enchantress Circe armed her son; and with this irresistible weapon he, unintentionally, became the murderer of his father Ulysses.

Succeeding naturalists finding the taste for the marvellous had decreased in their age, have been obliged to give the history of this fish a greater degree of verisimilitude, by curtailing it of its powers against inanimate nature, and contenting themselves with making it formidable only to fishermen. Their opinion has been sanctioned by Linnéus, who ascribes poisonous qualities to no less than three different fishes; the ray-sting, the torpedo, and the tetrodon lineatus. It may be justly doubted, however, whether any fish has a spine charged with actual poison; as far as the ray-sting is concerned, we know that this is not the case: the spine is merely its weapon of offence; with this it is capable of giving a very severe wound, and which being commonly inflicted on the tendinous parts of the body, and by those who are constantly working in cold water, is sometimes dangerous, and difficult of cure.

It is hence a very formidable weapon: and there is reason to believe, that in early times, before the use of iron, the spears and darts of barbarians were often headed with this bone, instead of that metal. The arrows of many of the South American tribes are still pointed with the spine of this fish, which from its hardness and sharpness produces often a fatal wound.

The fire-flare, formidable as it has been deemed, is never rejected by the fisherman when found in his tackle; he commonly cuts away the tail, and exposes it for sale, deprived of this instrument of mischief. This species never grows to the size of the preceding; the most common weigh about eight or ten pounds, and are about two or three feet from the snout to the end of the tail; the nose is very sharp at the point, but short; the mouth small, and provided with granulated teeth; the eyes protuberant; irids of an oblong shape, and golden colour. The whole body of the animal is smooth, flat below, but rounded above, and more elevated in the middle than any of the other rays.

The fire-flare casts its spine, and renews it annually; and that it may at no time be without a proper instrument of defence, it is sometimes seen with the new one growing up, before the old one drops off.

5. R. clavata. Thornback. Body spinous; teeth tuberculate; across the belly a strong semilunar cartilage; rhomboidal; broader, however, than long, and distinguished from all the other species of the ray by its spines, which consist of three rows upon the back, and five upon the tail, all pointing towards its end. Mouth is small; between the nose and the eyes a few spines; and others are scattered without any order upon the pectoral fins.

The colour of the upper part of the body is cinereous, marked with streaks of black, and the skin rough, with small tubercles like shagreen. The belly is white. It begins to generate in the month of June, and continues production till September; its young, as long they are incapable of breeding, are called maids; these are good eating at all times of the year, but the old only begin to be in season in the month of November.

The fishes of this species are found in great plenty, and make a considerable article in our fish markets. They are fond of devouring herring, mackrel, and eels; but their common

food is the different kinds of ground fish; crustaceous animals, such as the crab and lobster, have been also found in their stomachs. See Nat. Hist. Pl. CLXIX.

RAJA, the title of the Indian black princes, the remains of those who ruled there before the Moguls. Some of the rajas are said to preserve their independency, especially in the mountainous parts; but most of them pay an annual tribute to the Mogul. The Indians call them rai; the Persians, raian, in the plural; and our travellers rajas, or ragias.

RAJAMUNDRY, a town of Hindustan, capital of one of the five Circars. The principal riches consists in teak timber. It is seated on the Godavery, 35 miles from its mouth, and 170 S.W. of Cicacole. Lon. 81. 57 E. Lat. 17. 0 N.

RAJANA, in botany, a genus of the class dicœcia, order hexandria. Calyx six-parted; corolless. Female; styles three; fruit inferior, roundish, with an oblique wing. Seven species; climbing plants of East or West Indies, or South America.

RAJEMAL, a town of Hindustan, in Bengal, formerly a place of great trade, but now in a ruinous state. It is seated on the W. bank of the Ganges, 68 miles N.N.W. of Moorshedabad. Lon. 87. 50 E. Lat. 25. 0 N.

RAIL. *s.* (*riegel*, German.) 1. A cross beam fixed at the ends in two upright posts (*Moxon*). 2. A series of posts connected with beams, by which any thing is enclosed (*Bacon*). 3. A kind of bird. See RALLUS. 4. A woman's upper garment.

To RAIL. *v. a.* (from the noun.) 1. To enclose with rails (*Addison*). 2. To range in a line (*Bacon*).

To RAIL. *v. n.* (*railler*, Fr.) To use insolent and reproachful language; to speak to, or to mention in opprobrious terms (*Shakspeare*).

RAI'LER. *s.* (from *rail.*) One who insults or defames by opprobrious language (*South*).

RAI'LLERY. *s.* (*raillerie*, French.) Slight satire; satirical merriment (*Ben Jonson*).

RAILROAD, a modern contrivance for facilitating the conveyance of heavy goods. It consists simply of smooth bars of iron posited horizontally in two rows parallel to each other, at a convenient distance to receive the opposite wheels of a carriage: the road on which the horse draws lying between the two parallel rows or ranges of bars. The wheels of the carriages are usually so constructed with a groove running round them, as to apply freely to the respective rails, without a possibility of their slipping off. Sometimes this is effected by an elevation on the exterior side of the rails, the wheels being flat. In either case, the rails and wheels having tolerably smooth surfaces, admit of motion at a much less expence of animal force than on the common roads of this country. One horse will draw more by means of a rail-road than six could upon a common turnpike-road.

Heavy loads are not moved quite so easily upon rail-roads as in canals; but as the former are constructed at much less expence than the latter, they are very advantageously employed instead of them in various parts of Great Britain.

Mr. Charles Le Caan, of Llanelly, has lately improved the construction of tram-plates. He fastens them together by means of a tenon and mortise, each having a correspondent bevel, so that the head of each plate confines the end of the next succeeding one. These plates rest upon stone blocks or sleepers, placed at the distance of three feet from each other, into which they are fixed by means of perpendicular or beveled plugs cast in the head of each plate; those in the stop plates only being of the former kind. The blocks or sleepers on which the plates rest should by no means weigh less than 120lbs. each, and in some kinds of ground even heavier than this. Besides the advantage of having a more perfect rail-road, and several others, Mr. Le Caan estimates a saving of about 50l. per mile, by adopting this mode of construction.

Mr. Le Caan's method of fixing the plates, in which his principal improvement consists, appears to be well calculated to remove several of the disadvantages attending this operation, in the most approved constructions previously in use.

The plates used in the Surry rail-way have a counter-sunk rectangular notch in each end; and when joined together end-ways, these notches form a square hole, through which an iron spike, having its head fitted to the counter-sunk part, is driven into an oak plug inserted for that purpose in the stones upon which the ends of the plates rest; and thus confines their adjoining extremities in the proper places. In Mr. Woodhouse's patent for a new method of forming a cast-iron rail, described in the third volume of the Repertory of Arts, Second Series, the plates are to be fastened upon similar bearings by means of wrought-iron screws or cutter-bolts. And we are persuaded that, after attentively comparing these three different methods together, the reader will feel no hesitation in preferring Mr. Le Caan's plan. A very ingenious method of forming an iron rail-way, by means of elliptic rails, was invented by Mr. Benjamin Wyatt, and is described at page 285, vol. iii. of the Repertory, Second Series.

RAI'LMENT. *s.* Vesture; vestment; clothes; dress; garment (*Sidney*).

To RAIN. *v. n.* (renian, Saxon; *regenen*, Dutch.) 1. To fall in drops from the clouds (*Locke*). 2. To fall as rain (*Milton*). 3. *It* RAINS. The water falls from the clouds (*Shakspeare*).

To RAIN. *v. a.* To pour down as rain (*Shakspeare*).

RAIN, water that descends from the atmosphere in the form of drops of a considerable size. Rain is apparently a precipitated cloud; as clouds are nothing but vapours raised from moisture, waters, &c. By this circumstance it is distinguished from dew and fog: in the former of

which the drops are so small that they are quite invisible; and in the latter, though their size be larger, they seem to have very little more specific gravity than the atmosphere itself, and may therefore be reckoned hollow spherules rather than drops.

It is universally agreed, that rain is produced by the water previously absorbed by the heat of the sun, or otherwise, from the terraqueous globe, into the atmosphere, as vapours, or vesiculæ. These vesiculæ, being specifically lighter than the atmosphere, are buoyed up by it, till they arrive at a region where the air is in a just balance with them; and there they float, till by some new agent they are converted into clouds, and thence either into rain, snow, hail, mist, or the like.

But the agent in this formation of the clouds into rain, and even of the vapours into clouds, has been much controverted. Most philosophers will have it, that the cold, which constantly occupies the superior regions of the air, chills and condenses the vesiculæ, at their arrival from a warmer quarter; congregates them together, and occasions several of them to coalesce into little masses: and thus their quantity of matter increasing in a higher proportion than their surface, they become an overload to the thin air, and so descend in rain.

Dr. Derham accounts for the precipitation, hence; that the vesiculæ being full of air, when they meet with a colder air than that they contain, this is contracted into a less space: and consequently the watery shell or case becomes thicker, so as to become heavier than the air, &c.

But this separation cannot be ascribed to cold, since rain often takes place in very warm weather. And though we should suppose the condensation owing to the cold of the higher regions, yet there is a remarkable fact which will not allow us to have recourse to this supposition: for it is certain that the drops of rain increase in size considerably as they descend. On the top of a hill for instance, they will be small and inconsiderable, forming only a drizzling shower; but half way down the hill it is much more considerable; and at the bottom the drops will be very large, descending in an impetuous rain. Which shews that the atmosphere condenses the vapours as well where it is warm as where it is cold.

Others allow the cold only a part in the action, and bring in the winds as sharers with it: alleging, that a wind blowing against a cloud will drive its vesiculæ upon one another, by which means several of them, coalescing as before, will be enabled to descend; and that the effect will be still more considerable, if two opposite winds blow together towards the same place: they add, that clouds already formed, happening to be aggregated by fresh accessions of vapour continually ascending, may thence be enabled to descend.

Yet the grand cause, according to Rohault, is still behind. This author conceives it to be the heat of the air, which, after continuing for some time near the earth, is at length carried up on high by a wind, and there thawing the snowy villi or flocks of the half frozen vesiculæ, it reduces them into drops; which, coalescing, descend, and have their dissolution perfected in their progress through the lower and warmer stages of the atmosphere.

Others, as Dr. Clarke, &c. ascribe this descent of the clouds rather to an alteration of the atmosphere than of the vesiculæ; and suppose it to arise from a diminution of the spring or elastic force of the air. This elasticity, which depends chiefly or wholly on the dry terrene exhalations, being weakened, the atmosphere sinks under its burden; and the clouds fall, on the common principle of precipitation.

Now the small vesiculæ, by these or any other causes being once upon the descent, will continue to descend notwithstanding the increase of resistance they every moment meet with in their progress through still denser and denser parts of the atmosphere. For as they all tend toward the same point, viz. the centre of the earth, the farther they fall, the more coalitions will they make; and the more coalitions, the more matter will there be under the same surface; the surface only increasing as the squares, but the solidity as the cubes of the diameters: and the more matter under the same surface, the less friction or resistance there will be to the same matter.

Thus then, if the causes of rain happen to act early enough to precipitate the ascending vesiculæ, before they are arrived at any considerable height, the coalitions being few in so short a descent, the drops will be proportionably small; thus forming what is called dew. If the vapours prove more copious, and rise a little higher, there is produced a mist or fog. A little higher still, and they produce a small rain, &c. If they neither meet with cold nor wind enough to condense or dissipate them, they form a heavy, thick, dark sky, which lasts sometimes several days, or even weeks.

But later writers on this part of philosophical science have, with greater shew of truth, considered rain as an electrical phenomenon. Signior Beccaria reckons rain, hail, and snow, among the effects of a moderate electricity in the atmosphere. Clouds that bring rain, he thinks, are produced in the same manner as thunder clouds, only by a moderate electricity. He describes them at large; and the resemblance which all their phenomena bear to those of thunder clouds is very striking. He notes several circumstances attending rain without lightning, which render it probable that it is produced by the same cause as when it is accompanied with lightning. Light has been seen among the clouds by night in rainy weather; and even by day rainy clouds are sometimes seen to have a brightness evidently independent of the sun. The uniformity with which the clouds are spread, and with which the rain falls, he thinks are evidences of an uniform cause like that of electricity. The intensity also of electricity in his apparatus, usually corresponded very nearly to the quantity of rain that fell in the same time. Sometimes all the phenomena of thunder, lightning, hail, rain, snow, and wind, have been observed at one time; which shews the connection they all have with some common cause. Signior Beccaria therefore supposes that, previous to rain, a quantity of electric matter escapes out of the earth, in some place where it is redundant; and in its ascent to the higher regions of the air, collects and conducts into its path a great quantity of vapours. The same cause, that collects, will condense them more and more; till, in the places of the nearest intervals, they come almost into contact, so as to form small drops; which, uniting with others as they fall, come down in rain.

The rain will be heavier in proportion as the electricity is more vigorous, and the cloud approaches more nearly to a thunder cloud. He imitated the appearance of clouds that bring rain by insulating himself between the rubber and conductor of his electrical machine; and with one hand dropping colophonia into a spoon fastened to the conductor, and holding a burning coal, while his other hand communicated with the rubber. In these circumstances the smoke spread along his arm, and, by degrees, all over his body, till it came to the other hand that communicated with the rubber. The lower surface of this smoke was every where parallel to his clothes, and the upper surface was swelled and arched like clouds replete with thunder and rain. In this manner, he supposes, the clouds that bring rain diffuse themselves from over those parts of the earth which abound with electric fire, to those parts that are exhausted of it; and by letting fall their rain, restore the equilibrium between them. Signior Beccaria also thought, that the electricity communicated to the air, which both receives and parts with it slowly, would account for the retention of vapours in a clear sky; for small disjointed clouds, not dispersed into rain; for the smaller and lighter clouds in the higher regions of the air, which are but little affected by electricity; and also for the darker, heavy, and sluggish clouds in the lower regions, which retain more of it. He even imagined, that some alteration in the weight of the air might be made by this electricity of it: the phenomena of rain, he thought, favoured the supposition, that the electric matter in the air did, in some measure, lessen its pressure: for when the electric matter is actually in the air, collecting and condensing the vapours, the barometer is lowest. When the communication is made between the earth and the clouds by the rain, the quicksilver begins to rise; the electric matter, which supported part of the pressure, being discharged. Lettere dell Elettricismo. Priestley's Hist. &c. of Electricity, vol. i.

As to the general quantity of rain that falls, and its proportion in several places at the same time, and in the same place at several times, we have many observations, journals, &c. in the memoirs of the French academy, the Philos. Trans. &c. Some of these results are as below.

At Upminster, annually.		At Paris, annually.	
1700	19 inches .03	21 inches	.37
1701	18 .69	27	.77
1702	20 .38	17	.45
1703	23 .99	18	.51
1704	15 .80	21	.20
1705	16 .93	14	.82

From the Meteorological Journal of the Royal Society, kept by order of the president and council, it appears that the whole quantity of rain at London, in each of the years specified below, was as follows, viz.

	Inches.
1774	26 .328
1775	24 .083
1776	20 .354
1777	25 .371
1778	20 .772
1779	26 .785
1780	17 .313

The quantity of rain in the four following years at London was,

	Inches.
In 1789	21 .976
1790	16 .052
1791	15 .310
1792	19 .489

Proportion of the Rain of the several Seasons to one another.

1708	Depth at Pisa. Inch.	Depth at Upmins. Inch.	Depth at Zurich. Inch.	1708	Depth at Pisa. Inch.	Depth at Upmins. Inch.	Depth at Zurich. Inch.
Jan.	6 .41	2 .88	1 .64	July	0 .00	1 .11	3 .50
Feb.	3 .28	0 .46	1 .65	August	2 .27	2 .94	3 .15
March	2 .65	2 .03	1 .51	Sept.	7 .21	1 .46	3 .02
April	1 .25	0 .96	4 .69	Oct.	5 .33	0 .23	2 .44
May	3 .33	2 .02	1 .91	Nov.	2 .13	0 .86	0 .62
June	4 .90	2 .32	5 .91	Dec.	0 .00	1 .97	2 .62
Half Year	21 .82	10 .67	17. 31	Half Year	14 .94	8 .57	15 .35

In Dr. Clarke's and Mr. Blanchard's, of Nottingham, meteorological table for 1808, it appears that of the thirteen places enumerated where the observations were continued for the whole of the period, the greatest quantity of rain fell at Kendal, in Westmoreland, and was 43.34 inches, and the least at London, which is stated at 22.98 inches. At Chichester, Bristol, Chatsworth, Manchester, Lancaster, Dalton, and Kendal, the greatest quantity of rain fell in Oct. and was respectively 6.41, 5.26, 3.98, 5.32, 7.08, 6.53, and 7.25 inches. At London the greatest quantity fell in September, and was 4.18 inches. At West Bridgford, near Nottingham, in January, 2.85 inches. At Horncastle, in December, 4.10 inches. Ferriby and Kingston-upon-Hull, December, 5.01 inches. Heath, near Wakefield, March, 3.49 inches. Edinburgh, August, 7.51: the greatest quantity that fell at any of the above places in the space of one month. Also the annual quantity at Dalton was 39.99; at Chichester, 36.62; Lancaster, 32.48; Bristol, 32.08; Heath, 29.99; Edinburgh, 29.34; Chatsworth, 28.81; Manchester, 27.09; Ferriby, 26.95; Horncastle, 24.32; West Bridgford, 23.22; and to Cheltenham, for the first six months, 12.50 inches.

At Nottingham the number of fair days was 237, and of days on which rain fell 128.

In the year 1809, the same gentlemen's tables shew, that of the eleven places specified, the greatest annual quantity of rain fell at Dalton,

in Lancashire, and is stated at 50.36 inches. The least quantity was at West Bridgford, in Nottinghamshire, and was 17.55 inches. The greatest monthly quantity at Chichester and Chatsworth was in January; at the former it was 8.44, and at the latter 5·22 inches. At Chichester there was none in March; and at Chatsworth the least quantity fell in October, and was 0.28: the total at the two places being 38·07 and 29·91 inches. At London the greatest and least quantities were in July and October; the former was 3.58 and the latter 0·22: the annual quantity was 24·95. The greatest quantities at Horncastle, Ferriby, near Kingston-upon-Hull, Heath, near Wakefield, Yorkshire, Lancaster, Dalton, Bridgford, and Nottingham, fell in August: and were respectively 4·53, 5·88, 4·61, 6·12, 7·25, 3·75, and 4·50. The least quantities at the following places were, at Horncastle, in October, 0·75 inches; at Ferriby, in May, 0·45; Heath, Manchester, Lancaster, and Dalton, in March, 0·43, 0·35, 0.53, and 1·13, respectively; Nottingham, October, 0·31. The total quantities were, at Horncastle, 28·38; Ferriby, 27.97; Heath, 31·65; Manchester, 29·10; Lancaster, 41.73; Nottingham, 23·01. At Nottingham this year, the number of fair days was 234, and of days on which rain fell 131. On the 19th of April snow fell to the depth of a foot!

RAIN-GUAGE. See PLUVIAMETER.

RAIN, a fortified town of Bavaria, seated on the Acha, near the Lech and the Danube, 12 miles W. of Neuburg.

RAIN, or OLD RAIN, a town of Scotland, in Aberdeenshire, near the river Ury, 23 miles NW. of Aberdeen.

RAIN-LAKE, a lake of N. America, lying E. of Lake of the Woods, and W. of Lake Superior. It is nearly 100 miles long, and in no part more than 20 wide.

RAINBOW, *Iris*, or simply the *bow*, is a meteor in form of a party-coloured arch, or semicircle, exhibited in a rainy sky, opposite to the sun, by the refraction and reflection of his rays in the drops of falling rain. There is also a secondary, or fainter bow, usually seen investing the former at some distance. Among naturalists, we also read of lunar rainbows, marine rainbows, &c.

This beautiful phenomenon has engaged the attention of all ages. By some nations it hath been deified; though the more sensible part always looked upon it as a natural appearance, and endeavoured, however imperfectly, to account for it. The observations of the ancients and philosophers of the middle ages concerning the rainbow were such as could not have escaped the notice of the most illiterate husbandmen who gazed at the sky; and their various hypotheses deserve no notice. It was a considerable time even after the dawn of true philosophy in this western part of the world, before we find any discovery of importance on this subject. Maurolycus was the first who pretended to have measured the diameters of the two rainbows with much exactness; and he reports, that he found that of the inner bow to be 45 degrees, and that of the outer bow 56; from which Descartes takes occasion to observe how little we can depend upon the observations of those who were not acquainted with the cause of the appearances.

One Clichtovæus (the same, it is probable, who distinguished himself by his opposition to Luther, and who died in 1543) had maintained, that the second bow is the image of the first, as he thought was evident from the inverted order of the colours. For, said he, when we look into the water, all the images that we see reflected by it are inverted with respect to the objects themselves; the tops of the trees, for instance, that stand near the brink, appearing lower than the roots.

That the rainbow is opposite to the sun had always been observed. It was, therefore, natural to imagine, that the colours of it were produced by some kind of reflection of the rays of light from drops of rain, or vapour. The regular order of the colours was another circumstance that could not have escaped the notice of any person. But, notwithstanding mere reflection had in no other case been observed to produce colours, and it could not but have been observed that refraction is frequently attended with that phenomenon, yet no person seems to have thought of having recourse to a proper refraction in this case, before one Fletcher of Breslau, who, in a treatise which he published in 1571, endeavoured to account for the colours of the rainbow by means of a double refraction and one reflection. But he imagined that a ray of light, after entering a drop of rain, and suffering a refraction both at its entrance and exit, was afterwards reflected from another drop, before it reached the eye of the spectator. He seems to have overlooked the reflection at the farther side of the drop, or to have imagined that all the bendings of the light within the drop would not make a sufficient curvature to bring the ray of the sun to the eye of the spectator. That he should think of two refractions, was the necessary consequence of his supposing that the ray entered the drop at all. This supposition, therefore, was all the light that he threw upon the subject. B. Porta supposed that the rainbow is produced by the refraction of light in the whole body of rain or vapour, but not in the separate drops.

After all, it was a man whom no writers allow to have had any pretensions to philosophy that hit upon this curious discovery. This was Antonio De Dominis, bishop of Spalatro, whose treatise De Radiis Visus et Lucis was published by J. Bartolus in 1611. He first advanced, that the double refraction of Fletcher, with an intervening reflection, was sufficient to produce the colours of the bow, and also to bring the rays that formed them to the eye of the spectator, without any subsequent reflection. He distinctly describes the progress of a ray of light entering the upper part of the drop, where it suffers one refraction, and after being thereby thrown upon the back part of the inner surface, is from thence reflected to the lower part of the drop; at which place undergoing a second refraction, it is thereby bent, so as to come directly to the eye. To verify this hypothesis, this person (no philosopher as he was) proceeded in a very sensible and philosophical manner. For he procured a small globe of solid glass, and viewing it when it was exposed to the rays of the sun, in the same manner in which he had supposed that the drops of rain were situated with respect to them, he actually observed the same colours which he had seen in the true rainbow, and in the same order.

Thus the circumstances in which the colours of the rainbow were formed, and the progress of a ray of light through a drop of water, were clearly understood; but philosophers were a long

time at a loss when they endeavoured to assign reasons for all the particular colours, and for the order of them. Indeed nothing but the doctrine of the different refrangibility of the rays of light, which was a discovery reserved for the great sir Isaac Newton, could furnish a complete solution of this difficulty. De Dominis supposed that the red rays were those which had traversed the least space in the inside of a drop of water, and therefore retained more of their native force, and consequently, striking the eye more briskly, gave it a stronger sensation; that the green and blue colours were produced by those rays, the force of which had been, in some measure, obtunded in passing through a greater body of water; and that all the intermediate colours were composed (according to the hypothesis which generally prevailed at that time) of a mixture of these three primary ones. That the different colours were caused by some difference in the impulse of light upon the eye, and the greater or less impression that was thereby made upon it, was an opinion which had been adopted by many persons, who had ventured to depart from the authority of Aristotle.

Afterwards the same De Dominis observed, that all the rays of the same colour must leave the drop of water in a part similarly situated with respect to the eye, in order that each of the colours may appear in a circle, the centre of which is a point of the heavens, in a line drawn from the sun through the eye of the spectator. The red rays, he observed, must issue from the drop nearest to the bottom of it, in order that the circle of red may be the outermost, and therefore the most elevated in the bow.

Notwithstanding De Dominis conceived so justly of the manner in which the inner rainbow is formed, he was far from having as just an idea of the cause of the exterior bow. This he endeavoured to explain in the very same manner in which he had done the interior, viz. by one reflection of the light within the drop, preceded and followed by a refraction; supposing only that the rays which formed the exterior bow were returned to the eye by a part of the drop lower than that which transmitted the red of the interior bow. He also supposed that the rays which formed one of the bows came from the superior part of the sun's disk, and those which formed the other from the inferior part of it. He did not consider, that upon those principles the two bows ought to have been contiguous; or rather, that an indefinite number of bows would have had their colours all intermixed; which would have been no bow at all.

When sir Isaac Newton discovered the different refrangibility of the rays of light, he immediately applied his new theory of light and colours to the phenomena of the rainbow, taking this remarkable object of philosophical enquiry where De Dominis and Descartes, for want of this knowledge, were obliged to leave their investigations imperfect. For they could give no good reason why the bow should be coloured, and much less could they give any satisfactory account of the order in which the colours appear.

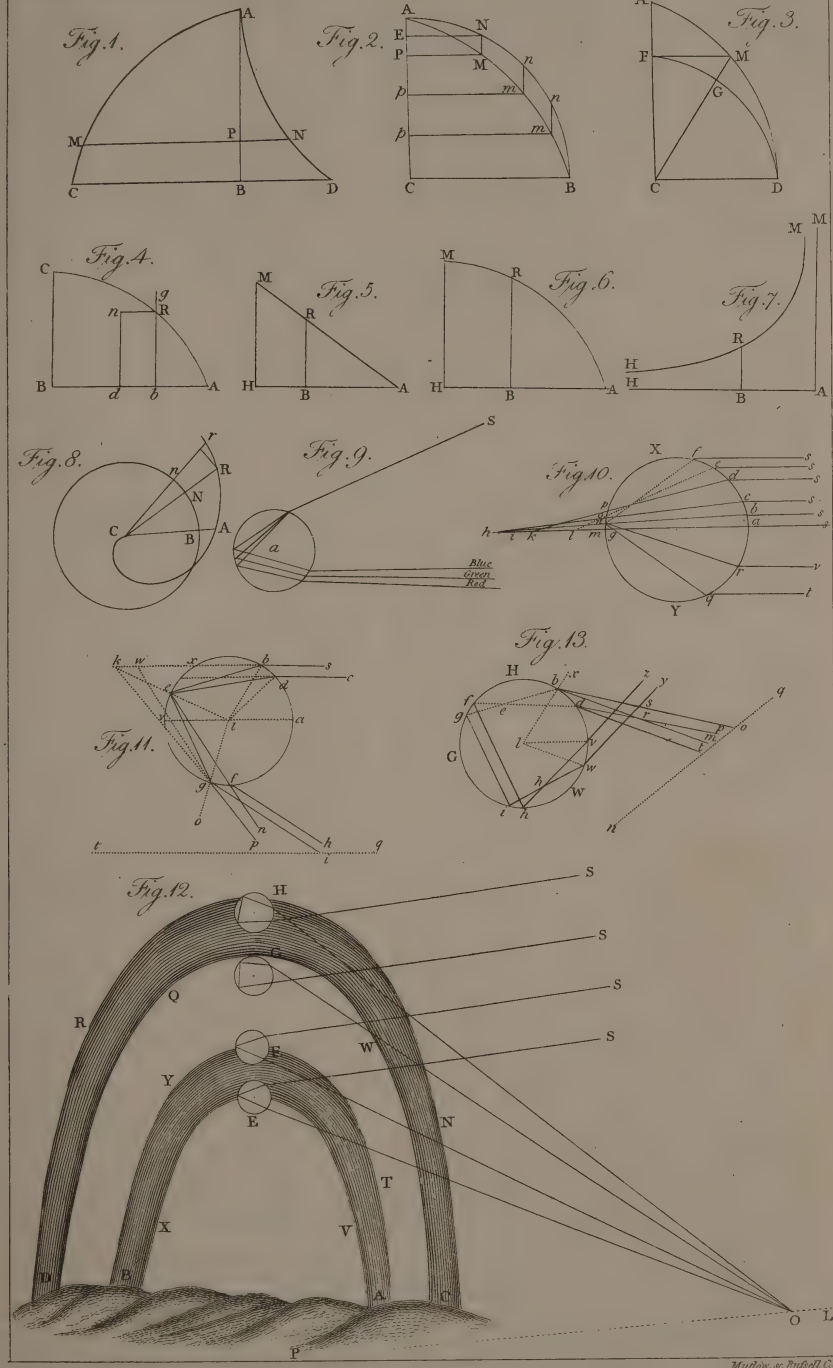
If different particles of light had not different degrees of refrangibility, on which the colours depend, the rainbow, besides being much narrower than it is, would be colourless; but the different refrangibility of differently coloured rays being admitted, the reason is obvious, both why the bow should be coloured, and also why the colours should appear in the order in which they are observed. Let a (pl. 148, fig. 9.) be a drop of water, and S a pencil of light; which, on its leaving the drop of water, reaches the eye of the spectator. This ray, at its entrance into the drop, begins to be decomposed into its proper colours; and upon leaving the drop, after one reflection and a second refraction, it is farther decomposed into as many small differently-coloured pencils as there are primitive colours in the light. Three of them only are drawn in this figure, of which the blue is the most, and the red the least refracted.

The doctrine of the different refrangibility of light enables us to give a reason for the size of a bow of each particular colour. Newton, having found that the sines of refraction of the most refrangible and least refrangible rays, in passing from rain-water into air, are in the proportion of 185 to 182, when the sine of incidence is 138, calculated the size of the bow; and he found, that if the sun was only a physical point, without sensible magnitude, the breadth of the inner bow would be two degrees; and if to this 30′ was added for the apparent diameter of the sun, the whole breadth would be $2\frac{1}{2}$ degrees. But as the outermost colours, especially the violet, are extremely faint, the breadth of the bow will not in reality appear to exceed two degrees. He finds, by the same principles, that the breadth of the exterior bow, if it was every where equally vivid, would be 4° 20′. But in this case there is a greater deduction to be made, on account of the faintness of the light of the exterior bow; so that, in fact, it will not appear to be more than three degrees broad.

The principal phenomena of the rainbow are all explained on sir Isaac Newton's principles, in the following propositions:

When the rays of the sun fall upon a drop of rain and enter into it, some of them, after one reflection and two refractions, may come to the eye of a spectator who has his back towards the sun, and his face towards the drop.

If XY (fig. 10.) is a drop of rain, and the sun shines upon it in any lines sf, sd, sa, &c. most of the rays will enter into the drop; some few of them only will be reflected from the first surface; those rays which are reflected from thence do not come under our present consideration, because they are never refracted at all. The greatest part of the rays then enter the drop, and those passing on to the second surface, will most of them be transmitted through the drop; but neither do those rays which are thus transmitted fall under our present consideration, since they are not reflected. For the rays, which are described in the proposition, are such as are twice refracted and once reflected. However, at the second surface, or hinder part of the drop, at pg, some few rays will be reflected, whilst the rest are transmitted: those rays proceed in some such lines as nr, nq; and coming out of the drop in the lines rv, qt, may fall upon the eye of a spectator, who is placed anywhere in those lines, with his face towards the drop, and consequently with his back towards the sun, which is supposed to shine upon the drop in the lines sf, sd, sa, &c. These rays are twice refracted and once reflected; they are refracted when they pass out of the air into the drop; they are reflected from the second surface, and are refracted again when they pass out of the drop into the air.



Muddw. sc. Russell Co.

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When rays of light reflected from a drop of rain come to the eye, those are called effectual which are able to excite a sensation.

When rays of light come out of a drop of rain, they will not be effectual, unless they are parallel and contiguous.

There are but few rays that can come to the eye at all: for since the greatest part of those rays which enter the drop XY (fig. 10.) between X and *a*, pass out of the drop through the hinder surface *p g*; only few are reflected from thence, and come out through the nearer surface between *a* and *y*. Now, such rays as emerge, or come out of the drop, between *a* and Y, will be ineffectual, unless they are parallel to one another, as *r v* and *q t* are; because such rays as come out diverging from one another will be so far asunder when they come to the eye, that all of them cannot enter the pupil; and the very few that can enter it will not be sufficient to excite any sensation. But even rays, which are parallel, as *r v*, *q t*, will not be effectual, unless there are several of them contiguous or very near to one another. The two rays *r v* and *q t* alone will not be perceived, though both of them enter the eye; for so very few rays are not sufficient to excite a sensation.

When rays of light come out of a drop of rain after one reflection, those will be effectual which are reflected from the same point, and which entered the drop near to one another.

Any rays, as *s b* and *c d* (pl. 148, fig. 11.), when they have passed out of the air into a drop of water, will be refracted towards the perpendiculars *b l d l*; and as the ray *s b* falls farther from the axis *a v* than the ray *c d*, *s b* will be more refracted than *c d*; so that these rays, though parallel to one another at their incidence, may describe the lines *b e* and *d e* after refraction, and be both of them reflected from one and the same point *e*. Now all rays which are thus reflected from one and the same point, when they have described the lines *e f*, *e g*, and after reflection emerge at *f* and *g*, will be so refracted, when they pass out of the drop into the air, as to describe the lines *f h*, *g i*, parallel to one another. If these rays were to return from *e* in the lines *e b*, *e d*, and were to emerge at *b* and *d*, they would be refracted into the lines of their incidence *b s*, *d c*. But if these rays, instead of being returned in the lines *e b*, *e d*, are reflected from the same point *e* in the lines *e g*, *e f*, the lines of reflection *e g* and *e f* will be inclined both to one another, and to the surface of the drop; just as much as the lines *e b* and *e d* are. First *e b* and *e g* make just the same angle with the surface of the drop: for the angle *b e x*, which *e b* makes with the surface of the drop, is the complement of incidence, and the angle *g e v*, which *e g* makes with the surface, is the complement of reflection; and these two are equal to one another. In the same manner we might prove, that *e d* and *e f* make equal angles with the surface of the drop. Secondly, the angle *b e d* is equal to the angle *f e g*; or the reflected rays *e g*, *e f*, and the incident rays *b e*, *d e*, are equally inclined to each other. For the angle of incidence *b e l* is equal to the angle of reflection *g e l*, and the angle of incidence *d e l* is equal to the angle of reflection *f e l*; consequently the difference between the angles of incidence is equal to the difference between the angles of reflection, or $b e l - d e l = g e l - f e l$, or $b e d = g e f$. Since therefore either the lines *e g*, *e f*, or the lines *e b*, *e d*, are equally inclined both to one another and to the surface of the drop, the rays will be refracted in the same manner, whether they were to return in the lines *e b*, *e d*, or are reflected in the lines *e g*, *e f*. But if they were to return in the lines *e b*, *e d*, the refraction, when they emerge at *b* and *d*, would make them parallel. Therefore, if they are reflected from one and the same point *e* in the lines *e g*, *e f*, the refraction, when they emerge at *g* and *f*, will likewise make them parallel.

But though such rays as are reflected from the same point in the hinder part of a drop of rain are parallel to one another when they emerge, and so have one condition that is requisite towards making them effectual, yet there is another condition necessary; for rays, that are effectual, must be contiguous as well as parallel. And though rays, which enter the drop in different places, may be parallel when they emerge, those only will be contiguous which enter it nearly at the same place.

Let XY (fig. 10.) be a drop of rain, *a g* the axis or diameter of the drop, and *s u* a ray of light that comes from the sun and enters the drop at the point *a*. This ray *s a*, because it is perpendicular to both the surfaces, will pass straight through the drop in the line *a g h* without being refracted; but any collateral rays, such as those that fall about *s b*, as they pass through the drop, will be made to converge to their axis, and passing out at *n* will meet the axis at *k*: rays which fall farther from the axis than *s b*, such as those which fall about *s c*, will likewise be made to converge; but then their focus will be nearer to the drop than *k*. Suppose therefore *i* to be the focus to which the rays that fall about *s c* will converge, any ray, *s c*, when it has described the line *c o* within the drop, and is tending to the focus *i*, will pass out of the drop at the point *o*. The rays that fall upon the drop about *s d*, more remote still from the axis, will converge to a focus still nearer than *i*, as suppose at *k*. These rays therefore go out of the drop at *p*. The rays, that fall still more remote from the axis, as *s e*, will converge to a focus nearer than *k*, as suppose at *l*; and the ray *s e*, when it has described the line *e o* within the drop, and is tending to *l*, will pass out at the point *o*. The rays that fall still more remote from the axis will converge to a focus still nearer. Thus the ray *s f* will, after refraction, converge to a focus at *m*, which is nearer than *l*; and having described the line *f n* within the drop, it will pass out to the point *n*. Now here we may observe, that as any rays *s b*, or *s c* fall farther above the axis *s a*, the points *n*, or *o*, where they pass out behind the drop, will be farther above *g*; or that, as the incident ray rises from the axis *s a*, the arc *g n o* increases, till we come to some ray *s d*, which passes out of the drop at *p*; and this is the highest point where any ray that falls upon the quadrant or quarter *a x* can pass out: for any rays *s e*, or *s f*, that fall higher than *s d*, will not pass out in any point above *p*, but at the points *o* or *n*, which are below it. Consequently, though the arc *g n o p* increases, whilst the distance of the incident ray from the axis *s a* increases, till we come to the ray *s d*; yet afterwards, the higher the ray falls above the axis *s a*, this arc *p o n g* will decrease.

We have hitherto spoken of the points on the

hinder part of the drop, where the rays pass out of it; but this was for the sake of determining the points from whence those rays are reflected, which do not pass out behind the drop. For, in explaining the rainbow, we have no farther reason to consider those rays which go through the drop; since they can never come to the eye of a spectator placed any where in the lines $r v$ or $q t$ with his face towards the drop. Now, as there are many rays which pass out of the drop between g and p, so some few rays will be reflected from thence; and consequently the several points between g and p, which are the points where some of the rays pass out of the drop, are likewise the points of reflection for the rest which do not pass out. Therefore, in respect of those rays which are reflected, we may call $g p$ the arc of reflection; and may say, that this arc of reflection increases, as the distance of the incident ray from the axis $s a$ increases, till we come to the ray $s d$; the arc of reflection is $g n$ for the ray $s b$, it is $g o$ for the ray $s c$; and $g p$ for the ray $s d$. But after this, as the distance of the incident ray from the axis $s a$ increases, the arc of reflection decreases; for $o g$ less than $p g$ is the arc of reflection for the ray $s e$, and $n g$ is the arc of reflection for the ray $s f$.

From hence it is obvious, that some one ray, which falls above $s d$, may be reflected from the same point with some other ray which falls below $s d$. Thus, for instance, the ray $s b$ will be reflected from the point n, and the ray $s f$ will be reflected from the same point; and consequently, when the reflected rays $n r$, $n q$, are refracted as they pass out of the drop at r and q, they will be parallel, by what has been shewn in the former part of this proposition. But since the intermediate rays, which enter the drop between $s f$ and $s b$, are not reflected from the same point n, these two rays alone will be the parallel to one another when they come out of the drop, and the intermediate rays will not be parallel to them. And consequently, these rays $r v$, $q t$, though they are parallel after they emerge at r and q, will not be contiguous, and for that reason will not be effectual; the ray $s d$ is reflected from p, which has been shewn to be the limit of the arc of reflection; such rays as fall just above $s d$, and just below $s d$, will be reflected from nearly the same point p, as appears from what has been already shewn. These rays therefore will be parallel, because they are reflected from the same point p; and they will likewise be contiguous, because they all of them enter the drop at one and the same place very near to d. Consequently, such rays as enter the drop at d, and are reflected from p the limit of the arc of reflection, will be effectual; since, when they emerge at the fore part of the drop between a and y, they will be both parallel and contiguous.

If we can make out hereafter that the rainbow is produced by the rays of the sun which are thus reflected from drops of rain as they fall whilst the sun shines upon them, this proposition may serve to shew us, that this appearance is not produced by any rays that fall upon any part, and are reflected from any part of those drops: since this appearance cannot be produced by any rays but those which are effectual; and effectual rays must always enter each drop at one certain place in the fore-part of it, and must likewise be reflected from one certain place in the hinder surface.

When rays that are effectual emerge from a drop of rain after one reflection and two refractions, those which are most refrangible will, at their emersion, make a less angle with the incident rays than those do which are least refrangible; and by this means the rays of different colours will be separated from one another.

Let $f h$ and $g i$ (pl. 148, fig. 11.) be effectual violet rays emerging from the drop at $f g$; and $f n$, $g p$, effectual red rays emerging from the same drop at the same place. Now, though all the violet rays are parallel to one another, because they are supposed effectual, and though all the red rays are likewise parallel to one another for the same reason; yet the violet rays will not be parallel to the red rays. These rays, as they have different colours, and different degrees of refrangibility, will diverge from one another; any violet ray $g i$, which emerges at g, will diverge from any red ray $g p$, which emerges at the same place. Now, both the violet ray $g i$, and the red ray $g p$, as they pass out of the drop of water into the air, will be refracted from the perpendicular $l o$. But the violet ray is more refrangible than the red one; and for that reason $g i$, or the refracted violet ray, will make a greater angle with the perpendicular than $g p$ the refracted red ray; or the angle $i g o$ will be greater than the angle $p g o$. Suppose the incident ray $s b$ to be continued in the direction $s k$, and the violet ray $i g$ to be continued backward in the direction $i k$, till it meets the incident ray at k. Suppose likewise the red ray $p g$ to be continued backwards in the same manner, till it meets the incident ray at w. The angle $i k s$ is that which the violet ray, or most refrangible ray at its emersion, makes with the incident ray; and the angle $p w s$ is that which the red ray, or least refrangible ray at its emersion, makes with the incident ray. The angle $i k s$ is less than the angle $p w s$. For, in the triangle, $g w k$, $g w s$, or $p w s$, is the external angle at the base, and $g w k$ or $i k s$ is one of the internal opposite angles; and either internal opposite angle is less than the external angle at the base. (Euc. b. 1. prop. 16.) What has been shewn to be true of the rays $g i$ and $g p$ might be shewn in the same manner of the rays $f h$ and $f n$, or of any other rays that emerge respectively parallel to $g i$ and $g p$. But all the effectual violet rays are parallel to $g i$, and all the effectual red rays are parallel to $g p$. Therefore the effectual violet rays at their emersion make a less angle with the incident ones than the effectual red ones. And for the same reason, in all the other sorts of rays, those which are most refrangible, at their emersion from a drop of rain after one reflection, will make a less angle with the incident rays, than those do which are less refrangible.

Or otherwise: when the rays $g i$ and $g p$ emerge at the same point g, as they both come out of water into air, and consequently are refracted from the perpendicular, instead of going straight forwards in the line $e g$ continued, they will both be turned round upon the point g, from the perpendicular $g o$. Now it is easy to conceive, that either of these lines might be turned in this manner upon the point g as upon a centre, till they became parallel to $s b$ the incident ray. But if either of these lines or rays were refracted so much from $g o$ as to become parallel to $s b$, the ray so much refracted would, after emersion, make no angle with $s k$, because it would be pa-

rallel to it. And consequently that ray which is most turned round upon the point g, or that ray which is most refrangible, will, after emersion, be nearest parallel to the incident ray, or will make the least angle with it. The same may be proved of all other rays emerging parallel to gi and gp respectively, or of all effectual rays; those which are most refrangible will, after emersion, make a less angle with the incident rays than those do which are least refrangible.

But since the effectual rays of different colours make different angles with sk at their emersion, they will be separated from one another: so that if the eye was placed in the beam $fghi$, it would receive only rays of one colour from the drop $xagv$; and if it was placed in the beam $fgnp$, it would receive only rays of some other colour.

The angle swp, which the least refrangible or red rays make with the incident ones when they emerge so as to be effectual, is found by calculation to be 42 degrees two minutes. And the angle ski, which the most refrangible rays make with the incident ones when they emerge so as to be effectual, is found to be 40 degrees 17 minutes. The rays which have the intermediate degrees of refrangibility, make with the incident ones intermediate angles beween 42 degrees two minutes, and 40 degrees 17 minutes.

If a line is supposed to be drawn from the centre of the sun through the eye of the spectator, the angle which any effectual ray, after two refractions and one reflection, makes with the incident ray, will be equal to the angle which it makes with that line.

Let the eye of the spectator be at i (pl. 148, fig. 11.), and let qt be the line supposed to be drawn from the centre of the sun through the eye of the spectator; the angle git, which any effectual ray makes with this line, will be equal to the angle iks, which the same ray makes with the incident ray sb or sk. If sb is a ray coming from the centre of the sun, then, since qt is supposed to be drawn from the same point, these two lines, upon account of the remoteness of the point from whence they are drawn, may be looked upon as parallel to one another. But the right line ki crossing these two parallel lines will make the alternate angles equal. (Euc. b. 1. prop. 29.) Therefore kit or git is equal to ski.

When the sun shines upon the drops of rain as they are falling, the rays that come from those drops to the eye of a spectator, after one reflection and two refractions, produce the primary rainbow.

If the sun shines upon the rain as it falls, there are commonly seen two bows, as AFB, CHD, (fig. 12.); or if the cloud and rain does not reach over that whole side of the sky where the bows appear, then only a part of one or of both bows is seen in that place where the rain falls. Of these two bows, the innermost AFB is the more vivid of the two, and this is called the primary bow. The outer part TFY of the primary bow is red, the inner part VEX is violet; the intermediate parts, reckoning from the red to the violet, are orange, yellow, green, blue, and indigo. Suppose the spectator's eye to be at O, and let LOP be an imaginary line drawn from the centre of the sun through the eye of the spectator: if a beam of light S coming from the sun falls upon any drop F; and the rays that emerge at F in the line FO, so as to be effectual, make an angle FOP of 42° 2′ with the line LP; then these effectual rays make an angle of 42° 2′ with the incident rays, by the preceding proposition, and consequently these rays will be red, so that the drop F will appear red. All the other rays, which emerge at F, and would be effectual if they fell upon the eye, are refracted more than the red ones, and consequently will pass above the eye. If a beam of light S falls upon the drop E; and the rays that emerge at E in the line EO, so as to be effectual, make an angle EOP of 40° 17′ with the line LP; then these effectual rays make likewise an angle of 40° 17′ with the incident rays, and the drop E will appear of a violet colour. All the other rays, which emerge at E, and would be effectual if they came to the eye, are refracted less than the violet ones, and therefore pass below the eye. The intermediate drops between F and E will, for the same reasons, be of the intermediate colours.

Thus we have shewn why a set of drops from F to E, as they are falling, should appear of the primary colours, red, orange, yellow, green, blue, indigo, and violet. It is not necessary that the several drops, which produce these colours, should all of them fall at exactly the same distance from the eye. The angle FOP, for instance, is the same whether the distance of the drop from the eye is OF, or whether it is in any other part of the line OF something nearer to the eye. And whilst the angle FOP is the same, the angle made by the emerging and incident rays, and consequently the colour of the drop, will be the same. This is equally true of any other drop. So that, although in the figure, the drops F and E are represented as falling perpendicularly one under the other, yet this is not necessary in order to produce the bow.

But the coloured line FE, which we have already accounted for, is only the breadth of the bow. It still remains to be shown, why not only the drop F should appear red, but why all the other drops quite from A to B in the arc ATFYB should appear of the same colour. Now it is evident, that wherever a drop of rain is placed, if the angle which the effectual rays make with the line LP is equal to the angle FOP, that is, if the angle which the effectual rays make with the incident rays is 42° 2′, any of those drops will be red, for the same reason that the drop F is of this colour.

If FOP was to turn round upon the line OP, so that one end of this line should always be at the eye, and the other be at P opposite to the sun; such a motion of this figure would be like that of a pair of compasses turning round upon one of the legs OP with the opening FOP. In this revolution the drop F would describe a circle, P would be the centre, and ATFYB would be an arc in this circle. Now since, in this motion of the line and drop OF, the angle made by FO with OP, that is, the angle FOP continues the same; if the sun was to shine upon this drop as it revolves, the effectual rays would make the same angle with the incident rays, in whatever part of the arc ATFYB the drop was to be. Therefore, whether the drop is at A, or at T, or at Y, or at B, or wherever else it is in this whole arc, it would appear red, as it does at F. The drops of rain, as they fall, are not indeed turned round in this manner: but then, as innumerable of them are falling at once in right lines from the cloud, whilst one drop is

at F, there will be others at Y, at T, at B, at A, and in every other part of the arc ATFYB: and all these drops will be red for the same reason that the drop F would have been red, if it had been in the same place. Therefore, when the sun shines upon the rain as it falls, there will be a red arc ATFYB opposite to the sun. In the same manner, because the drop E is violet, we might prove that any other drop, which, whilst it is falling, is in any part of the arc AVEXB, will be violet; and consequently, at the same time that the red arc ATFYB appears, there will likewise be a violet arc AVEXB below or within it. FE is the distance between these two coloured arcs; and from what has been said, it follows, that the intermediate space between these two arcs will be filled up with arcs of the intermediate colours, orange, yellow, blue, green, and indigo. All these coloured arcs together make up the primary rainbow.

The primary rainbow is never a greater arc than a semicircle.

Since the line LOP is drawn from the sun through the eye of the spectator, and since P (pl. 148. fig. 10.) is the centre of the rainbow; it follows, that the centre of the rainbow is always opposite to the sun. The angle FOP is an angle of 42° 2′, as was observed, or F the highest part of the bow is 42° 2′ from P the centre of it. If the sun is more than 42° 2′ high, P the centre of the rainbow, which is opposite to the sun, will be more than 42° 2′ below the horizon; and consequently F the top of the bow, which is only 42° 2′ from P, will be below the horizon; that is, when the sun is more than 42° 2′ high, no primary rainbow will be seen. If the sun is something less than 42° 2′ high, then P will be something less than 42° 2′ below the horizon; and consequently F, which is only 42° 2′ from P, will be just above the horizon; that is, a small part of the bow at this height of the sun will appear close to the ground opposite to the sun. If the sun is 20° high, then P will be 20° below the horizon; and F, the top of the bow, being 42° 2′ from P, will be 22° 2′ above the horizon; therefore, at this height of the sun, the bow will be an arc of a circle whose centre is below the horizon; and consequently that arc of the circle which is above the horizon, or the bow, will be less than a semi-circle. If the sun is in the horizon, then P, the centre of the bow, will be in the opposite part of the horizon; F, the top of the bow, will be 42° 2′ above the horizon; and the bow itself, because the horizon passes through the centre of it, will be a semicircle. More than a semi-circle can never appear; because, if the bow was more than a semicircle, P the centre of it must be above the horizon; but P is always opposite to the sun, therefore P cannot be above the horizon, unless the sun is below it; and when the sun is set, or is below the horizon, it cannot shine upon the drops of rain as they fall; and consequently when the sun is below the horizon, no bow at all can be seen.

When the rays of the sun fall upon a drop of rain, some of them, after two reflections and two refractions, may come to the eye of a spectator, who has his back towards the sun and his face towards the drop.

If HGW (fig. 13.) is a drop of rain, and parallel rays coming from the sun, as $z v$, $y w$, fall upon the lower part of it, they will be refracted towards the perpendiculars $v l$, $w l$, as they enter into it, and will describe some such lines as $v h$, $w i$. At k and i great part of these rays will pass out of the drop; but some of them will be reflected from thence in the lines $h f$, $i g$. At f and g again, great part of the rays that were reflected thither will pass out of the drop. But these rays will not come to the eye of a spectator at o. However, here again all the rays will not pass out; but some few will be reflected from f and g, in some such lines as $f d$, $g b$; and these, when they emerge out of the drop of water into the air at b and d, will be refracted from the perpendiculars, and, describing the lines $d t$, $b o$, may come to the eye of the spectator who has his back towards the sun and his face towards the drop.

Those rays, which are parallel to one another after they have been once refracted and once reflected in a drop of rain, will be effectual when they emerge after two refractions and two reflections.

No rays can be effectual, unless they are contiguous and parallel. From what was said, it appears, that when rays come out of a drop of rain contiguous to one another, either after one or after two reflections, they must enter the drop nearly at one and the same place. And if such rays as are contiguous are parallel after the first reflection, they will emerge parallel, and therefore will be effectual. Let $z v$ and $y w$ be contiguous rays which come from the sun, and are parallel to one another when they fall upon the lower part of the drop, suppose these rays to be refracted at v and w, and to be reflected at h and i; if they are parallel to one another, as $h f$, $g i$, after this first reflection, then, after they are reflected a second time from f and g, and refracted a second time as they emerge at d and b, they will go out of the drop parallel to one another in the lines $d t$ and $b o$, and will therefore be effectual.

The rays $z v$, $y w$, are refracted towards the perpendiculars $v l$, $w l$, when they enter the drop, and will be made to converge. As these rays are very oblique, their focus will not be far from the surface $v w$. If this focus is at k, the rays, after they have passed the focus, will diverge from thence in the directions $k h$, $k i$; and if $k i$ is the principal focal distance of the concave reflecting surface $h i$, the reflected rays $h f$, $i g$, will be parallel. These rays $e f$, $i g$, are reflected again from the concave surface $f g$, and will meet in a focus at e, so that $g e$ will be the principal focal distance of this reflecting surface $f g$. And because $h i$ and $f g$ are parts of the same sphere, the principal focal distances $g e$ and $k i$ will be equal to one another. When the rays have passed the focus e, they will diverge from thence in the lines $e d$, $e b$: and we are to show, that when they emerge at d and b, and are refracted there, they will become parallel.

Now if the rays $v k$, $w k$, when they have met at k, were to be turned back again in the directions $k v$, $k w$, and were to emerge at v and w, they would be refracted into the lines of their incidence, $v z$, $w y$, and therefore would be parallel. But since $g e$ is equal to $i k$, as has already been shown, the rays $e d$, $e b$, that diverge from e, fall in the same manner upon the drop at d and b, as the rays $k v$, $k w$, would fall upon it at v and w; and $e d$, $e b$, are just as much inclined to

the refracting surface $d\,h$, as $k\,v$, $k\,w$, would be to the surface $v\,w$. From hence it follows, that the rays $e\,d$, $e\,b$, emerging at d and b, will be refracted in the same manner, and will have the same direction in respect of one another, as $k\,v$, $k\,w$, would have. But $k\,v$ and $k\,w$ would be parallel after refraction. Therefore $e\,d$ and $e\,b$ will emerge in lines $d\,p$, $b\,o$, so as to be parallel to one another, and consequently so as to be effectual.

When rays that are effectual emerge from a drop of rain after two reflections and two refractions, those which are most refrangible will at their emersion make a greater angle with the incident rays than those do which are least refrangible; and by this means the rays of different colours will be separated from one another.

If rays of different colours, which are differently refrangible, emerge at any point b (Pl. 148, fig. 13.), these rays will not be all of them equally refracted from the perpendicular. Thus, if $b\,o$ is a red ray, which is of all others the least refrangible, and $b\,m$ is a violet ray, which is of all others the most refrangible; when these two rays emerge at b, the violet ray will be refracted more from the perpendicular $b\,x$ than the red ray, and the refracted angle $x\,b\,m$ will be greater than the refracted angle $x\,b\,o$. From hence it follows, that these two rays after emersion, will diverge from one another. In like manner, the rays that emerge at d will diverge from one another; a red ray will emerge in the line $d\,p$, a violet ray in the line $d\,t$. So that though all the effectual red rays of the beam $b\,d\,m\,t$ are parallel to one another, and all the effectual red rays of the beam $b\,d\,o\,p$ are likewise parallel to one another, yet the violet rays will not be parallel to the red ones, but the violet beam will diverge from the red beam. Thus the rays of different colours will be separated from one another.

This will appear farther, if we consider what the proposition affirms: that any violet or most refrangible ray will make a greater angle with the incident rays, than any red or least refrangible ray makes with the same incident rays. Thus, if $y\,w$ is an incident ray, $b\,m$ a violet ray emerging from the point b, and $b\,o$ a red ray emerging from the same point; the angle which the violet ray makes with the incident one is $y\,r\,m$, and that which the red ray makes with it is $y\,s\,o$. Now $y\,r\,m$ is a greater angle than $y\,s\,o$. For in the triangle $b\,r\,s$ the internal angle $b\,r\,s$ is less than $b\,s\,y$ the external angle at the base. (Eucl. b. 1. prop. 16.) But $y\,r\,m$ is the complement of $b\,r\,s$ or of $b\,r\,y$ to two right ones, and $y\,s\,o$ is the complement of $b\,s\,y$ to two right ones. Therefore, since $b\,r\,y$ is less than $b\,s\,y$, the complement of $b\,r\,y$ to two right angles will be greater than the complement of $b\,s\,y$, to two right angles; or $y\,r\,m$, will be greater than $y\,s\,o$.

Or otherwise: both the rays $b\,o$ and $b\,m$, when they are refracted in passing out of the drop at b, are turned round upon the point b from the perpendicular $b\,x$. Now either of these lines $b\,o$ or $b\,m$ might be turned round in this manner, till it made a right angle with $y\,w$. Consequently, that ray which is most turned round upon b, or which is most refracted, will make an angle with $y\,w$ that will be nearer to a right one than that ray makes with it which is least turned round upon b, or which is least refracted. Therefore that ray which is most refracted will make a greater angle with the incident ray than that which is least refracted.

But since the emerging rays, as they are differently refrangible, make different angles with the same incident ray $y\,w$, the refraction which they suffer at emersion will separate them from one another.

The angle $y\,r\,m$, which the most refrangible or violet rays make with the incident ones, is found by calculation to be 54° 7′; and the angle $y\,s\,o$, which the least refrangible or red rays make with the incident ones, is found to be 50° 57′: the angles, which the rays of the intermediate colours, indigo, blue, green, yellow, and orange, make with the incident rays, are intermediate angles between 54° 7′ and 50° 57′.

If a line is supposed to be drawn from the centre of the sun through the eye of the spectator; the angle which, after two refractions and two reflections, any effectual ray makes with the incident ray, will be equal to the angle which it makes with that line.

If $y\,w$ (fig. 13.) is an incident ray, $b\,o$ an effectual ray, and $q\,n$ a line drawn from the centre of the sun through o the eye of the spectator; the angle $y\,s\,o$, which the effectual ray makes with the incident ray, is equal to $s\,o\,n$ the angle which the same effectual ray makes with the line $q\,n$. For $y\,w$ and $q\,n$, considered as drawn from the centre of the sun, are parallel; $b\,o$ crosses them, and consequently makes the alternate angles $y\,s\,o$, $s\,o\,n$, equal to one another. Eucl. b. i. prop. 29.

When the sun shines upon the drops of rain as they are falling, the rays that come from these drops to the eye of a spectator, after two reflections and two refractions, produce the secondary rainbow.

The secondary rainbow is the outermost CHD, fig. 12. When the sun shines upon a drop of rain H; and the rays HO, which emerge at H so as to be effectual, make an angle HOP of 54° 7′ with LOP a line drawn from the sun through the eye of the spectator; the same effectual rays will make likewise an angle of 54° 7′ with the incident rays S, and the rays which emerge at this angle are violet ones, by what was observed above. Therefore, if the spectator's eye is at O, none but violet rays will enter it: for as all the other rays make a less angle with OP, they will fall above the spectator's eye. In like manner, if the effectual rays that emerge from the drop G make an angle of 50° 57′ with the line OP, they will likewise make the same angle with the incident rays S; and consequently, from the drop G to the spectator's eye at O, no rays will come but red ones; for all the other rays, making a greater angle with the line OP, will fall below the eye at O. For the same reason, the rays emerging from the intermediate drops between H and G, and coming to the spectator's eye at O, will emerge at intermediate angles, and therefore will have the intermediate colours. Thus, if there are seven drops from H to G inclusively, their colours will be violet, indigo, blue, green, yellow, orange, and red. This coloured line is the breadth of the secondary rainbow.

Now, if HOP was to turn round upon the line

OP, like a pair of compasses upon one of the legs OP with the opening HOP, it is plain from the supposition, that, in such a revolution of the drop H, the angle HOP would be the same, and consequently the emerging rays would make the same angle with the incident ones. But in such a revolution the drop would describe a circle of which P would be the centre, and CNHRD an arc. Consequently, since, when the drop is at N, or at R, or any where else in that arc, the emerging rays make the same angle with the incident ones as when the drop is at H, the colour of the drop will be the same to an eye placed at O, whether the drop is at N, or at H, or at R, or any where else in that arc. Now, though the drop does not thus turn round as it falls, and does not pass through the several parts of this arc, yet, since there are drops of rain falling every where at the same time, when one drop is at H, there will be another at R, another at N, and others in all parts of the arc; and these drops will all of them be violet-coloured, for the same reson that the drop H would have been of this colour if it had been in any of those places. In like manner, as the drop G is red when it is at G, it would likewise be red in any part of the arc CWGQD; and so will any other drop, when, as it is falling, it comes to any part of that arc. Thus, as the sun shines upon the rain whilst it falls, there will be two arcs produced, a violet-coloured one CNHRD, and a red one CWGQD; and for the same reasons the intermediate space between these two arcs will be filled up with arcs of the intermediate colours. All these arcs together make up the secondary rainbow.

The colours of the secondary rainbow are fainter than those of the primary rainbow; and are ranged in the contrary order.

The primary rainbow is produced by such rays as have been only once reflected; the secondary rainbow is produced by such rays as have been twice reflected. But at every reflection some rays pass out of the drop of rain without being reflected; so that the oftener the rays are reflected, the fewer of them are left. Therefore the colours of the secondary bow are produced by fewer rays, and consequently will be fainter than the colours of the primary bow.

In the primary bow reckoning from the outside of it, the colours are ranged in this order; red, orange, yellow, green, blue, indigo, violet. In the secondary bow, reckoning from the outside, the colours are violet, indigo, blue, green, yellow, orange, red. So that the red, which is the outermost or highest colour in the primary bow, is the innermost or lowest colour in the secondary one.

Now the violet rays, when they emerge so as to be effectual after one reflection, make a less angle with the incident rays than the red ones; consequently the violet rays make a less angle with the lines OP (Pl. 148, fig. 12.) than the red ones. But, in the primary rainbow, the rays are only once reflected, and the angle which the effectual rays make with OP is the distance of the coloured drop from P the centre of the bow. Therefore the violet drops, or violet arc, in the primary bow, will be nearer to the centre of the bow than the red drops or red arc; that is, the innermost colour in the primary bow will be violet, and the outermost colour will be red. And, for the same reason, through the whole primary bow, every colour will be nearer to the centre P, as the rays of that colour are more refrangible.

But the violet rays, when they emerge so as to be effectual after two reflections, make a greater angle with the incident rays than the red ones; consequently the violet rays will make a greater angle with the line OP, than the red ones. But in the secondary rainbow the rays are twice reflected, and the angle which effectual rays make with OP is the distance of the coloured drop from P the centre of the bow. Therefore the violet drops or violet arc in the secondary bow will be farther from the centre of the bow than the red drops or red arc; that is, the outermost colour in the secondary bow will be violet, and the innermost colour will be red. And, for the same reason, through the whole secondary bow, every colour will be further from the centre P, as the rays of that colour are more refrangible.

RA'INDEER. *s.* (hpanan, Saxon; *rangifer*, Latin.) A deer with large horns, which, in the northern regions, draws sledges through the snow.

RAI'NINESS. *s.* (from *rainy*.) The state of being showery.

RAI'N-WATER. *s.* Water not taken from springs, but falling from the clouds (*Mortimer*).

RAI'NY. *a.* (from *rain*.) Showery; wet (*Shakspeare*).

To RAISE. *v. a.* (*reiser*, Danish.) 1. To lift; to heave (*Pope*). 2. To set upright: as, *he* raised *a mast*. 3. To erect; to build up (*Joshua*). 4. To exalt to a state more great or illustrious (*Bacon*). 5. To amplify; to enlarge (*Shakspeare*). 6. To increase in current value (*Temple*). 7. To elevate; to exalt (*Pr.*). 8. To advance; to promote; to prefer (*Clar.*). 9. To excite; to put in action (*Milton*). 10. To excite to war or tumult (*Shakspeare*). 11. To rouse; to stir up (*Job*). 12. To give beginning of importance to: as, *he* raised *the family*. 13. To bring into being (*Milton*). 14. To call into view from the state of separate spirits (*Sandys*). 15. To bring from death to life (*Romans*). 16. To occasion; to begin (*Brown*). 17. To set up; to utter loudly (*Dryden*). 18. To collect; to obtain a certain sum (*Gay*). 19. To collect; to assemble; to levy (*Milton*). 20. To give rise to (*Milton*). 21. To procure to be bred or propagated: as, *he* raised *sheep*. 22. *To* RAISE *paste*. To form paste into pies without a dish (*Spectator*).

RAI'SER. *s.* (from *raise*.) He that raises (*Taylor*).

RAISINS, grapes prepared by suffering them to remain on the vine till they are perfectly ripe, and then drying them in the sun, or by the heat of an oven. The difference between raisins dried in the sun and those dried in ovens, is very obvious: the former are sweet and pleasant, but the latter have a latent acidity with the sweetness that renders them much less agreeable.

The common way of drying grapes for raisins,

is to tie two or three bunches of them together while yet on the vine, and dip them into a hot lixivium of wood-ashes, with a little of the oil of olives in it. This disposes them to shrink and wrinkle; and after this they are left on the vine three or four days separated on sticks in an horizontal situation, and then dried in the sun at leisure, after being cut from the tree. The finest and best raisins are those called in some places Damascus and Jube raisins; which are distinguished from the others by their size and figure: they are flat and wrinkled on the surface, soft and juicy within, and near an inch long; and, when fresh and growing on the bunch, are of the size and shape of a large olive.

The raisins of the sun, and jar-raisins, are all dried by the heat of the sun; and these are the sorts used in medicine. However, all the kinds have much the same virtues: they are all nutritive and balsamic; they are allowed to be attenuant, are said to be good in nephritic complaints, and are an ingredient in pectoral decoctions: in which cases, as also in all others where astringency is not required of them, they should have the stones carefully taken out.

RAISIN-WINE. See WINE.

RAISIN (Market), a town in Lincolnshire, with a market on Thursday, situate near the source of the Ancholm, 16 miles N.E. of Lincoln, and 147 N. of London.

RAKE. *s.* (race, Saxon; *racche*, Dutch.) 1. An instrument with teeth, by which the ground is divided, or light bodies are gathered up (*Dryden*). 2. (*rekel*, Dutch, a worthless cur dog.) A loose, disorderly, vitious, wild, gay, thoughtless fellow; a man addicted to pleasure (*Pope*).

To RAKE. *v. a.* (from the noun.) 1. To gather with a rake (*May*). 2. To clear with a rake (*Thomson*). 3. To draw together by violence (*Hooker*). 4. To scour; to search with eager and vehement diligence (*Swift*). 5. To heap together and cover (*Suckling*).

To RAKE. *v. n.* 1. To search; to grope (*South*). 2. To pass with violence (*Sidney*).

RAKE OF A SHIP, is all that part of her hull which hangs over both ends of her keel. That which is before is called the fore rake, or rake forward, and that part which is at the setting on of the stern-post is called the rake aft, or afterward.

RAKE, in farriery. A horse is said to rake, when, having been strained, he goes lame, and drags one of his fore legs in a semicircle, which is most apparent when he trots.

RAKE OF COLTS. See RAG.

RA'KEHELL. *s.* (*rake* and *hell.*) A wild, worthless, dissolute, debauched, sorry fellow (*Spenser*).

RA'KEHELLY. *a.* (from *rakehell.*) Wild; dissolute (*Ben Jonson*).

RA'KER. *s.* (from *rake.*) One that rakes.

RA'KISH. *a.* (from *rake.*) Loose; lewd; dissolute (*Clarissa*).

RALEIGH (Sir Walter), an illustrious Englishman, born at Hayes, Devonshire, 1552. He was for some time at Oriel college, Oxford, and in 1569 he accompanied the volunteers whom Elizabeth sent to France to support the protestants. Though afterwards he resided in the Middle Temple he paid no attention to the law; but in 1578 embarked for the Netherlands against the Spaniards, and the next year he went with his half-brother sir Humphrey Gilbert on an expedition to discover North America. In 1580, he engaged in the wars of Ireland, and was one of the commissioners for the government of Munster. On his return to England, he became a favourite of the court by his polite attention to the queen. Walking among her attendants, he extricated her from a dirty part of the road which she was afraid to cross, by spreading his new plush cloak on the ground, over which she gently trod and passed clean. This courtesy gained him the queen's favour, and he gradually rose to places of distinction. In 1583, he sailed again with his brother Gilbert in an expedition to Newfoundland, and soon after he obtained letters patent, and sailed to America, where he discovered Wigandacoa, which was called Virginia, in honour of his virgin mistress, and in this country he afterwards in a second and third voyage settled flourishing colonies. He had been chosen into parliament for Devonshire in 1584, and knighted, and he was now appointed seneschal of Cornwall, and warden of the Stannaries. A fourth and a fifth expedition were fitted out to Virginia; and if he had done no other service to the nation, his recommendation of tobacco, which he first introduced into the country from Virginia, would in a commercial point of view have procured him high distinction. In 1588, his courage was displayed against the Spanish armada, to the destruction of which he ably contributed, and the following year he was employed in the restoration of Antonio, the expelled king of Portugal. In 1592, he was in the expedition sent to attack the Spaniards at Panama, and on his return he became an active speaker in the house of commons; but he incurred the displeasure of the clergy, by accepting the grant of the manor of Sherborne, which formerly belonged to the see of Salisbury. Though called an atheist, it appears, however, that he was a zealous asserter of God and of his providence. In 1593, he offended the queen by an amour with one of her maids of honour, daughter of sir Nicolas Throgmorton; but after being imprisoned for several months he made due reparation for his violation of decorum, by marrying the lady. He engaged in 1595, in the conquest of Guiana in South America, and after storming the city of St. Joseph, and taking the Spanish governor prisoner, he returned to England. He went afterwards against Cadiz, and then opposed Essex, and contributed to the defeat of his treasonable designs; but on the death of the queen his happiness was at an end. On the accession of James, he was stripped of his honors, and tried and condemned for

high treason, on charges not only frivolous but arbitrary. Though reprieved he remained several years a prisoner in the Tower, while his estates were lavished on Car, the royal favourite. During his long captivity, which was soothed by the attentions of his wife, he wrote some valuable works, among which is his history of the world. In 1616, after a confinement of nearly 13 years, he was permitted to leave his prison, and James, as if pretending first to discover his merits, sent him to explore the golden mines of Guiana. The affair proved unfortunate, sir Walter lost his eldest son, who was killed by the Spaniards, and after destroying the town, he returned home to meet the most cruel treatment. Incensed at his conduct, the Spaniards complained by Gundomar, their ambassador, and James ordered Raleigh to be seized. Though no blame could attach to him, the king ordered his execution on his former attainder In vain the unfortunate man pleaded in his defence, and asserted that his life could not be taken away in consequence of a sentence passed 15 years before, and which had been revoked, since in his late expedition the king had granted him power of life and death over his crew. Nothing, however, availed, the pusillanimous James either to please the Spaniards, or to gratify his own enmity, disgracefully assented to his death. He was beheaded in Old Palace Yard, 29th Oct. 1618, and suffered with magnanimity. His body was interred in St. Margaret's Westminster, but his head was preserved several years in his family. Sir Walter must be pronounced one of the greatest characters of these times. His perseverance in making discoveries first inspired the nation with that ardour after maritime distinction, which has since not only increased its commerce and prosperity, but raised its glory to the most exalted rank. He was distinguished not only as a bold navigator, and a valiant leader, but as an able negociator; and as a man of letters his works, composed in the obscurity of a dungeon, on subjects of history, politics, geography, and philosophy, as well as some respectable poetical pieces, will transmit his name with honour to the most distant posterity. His son Carew, who was born in the Tower, was author of some sonnets, of a defence of his father, &c. He was governor of Jersey in 1659, and died in 1666. (*Lempriere*).

RALLUS. Rail. In zoology, a genus of the class aves, order grallæ. Bill tnickish at the base, attenuated on the back towards the tip, compressed, a little incurved, pointed; tongue rough at the tip; body compressed; tail short; feet four-toed, cleft. Thirty-one species; scattered over the globe, three common to our own country. The following are chiefly worthy of notice:

1. R. crex. Crake. Land rail. Wings reddish-rusty; bill and legs brown-ash; irids hazel; feathers of the body reddish-brown the upper ones black in the middle; chin very pale; belly whitish-yellow. Inhabits sedgy places of Europe and Asia; nine and a half inches long; migrates; runs swiftly along the grass, but flies slowly with its long feet hanging down; feeds on seeds and insects; and grows prodigiously fat: its note is harsh, resembling the words *crek, crek*, whence its specific name; lays from twelve to sixteen eggs in the dry grass of a dirty white colour, with a few yellow spots; flesh very excellent. They are found singly and but rarely in different parts of England, in the months of July, August, and September, in the standing corn and clover, but principally in the latter; where, when found, they are prejudicial to pointers, by their incessantly running, while the dog continues drawing on a quick walk till his patience being quite exhausted, the pointer is induced to play the spaniel, and make a springing effort before they can be forced to take wing; after which they are easily brought down from the heaviness of their flight. There are two other varieties from variation of colour in the East and West Indies.

2. R. aquaticus. Brook-ouzel. Water-rail. Wings grey, spotted with brown; flanks spotted with white; bill orange beneath; blackreddish at the base; irids red; feathers of the upper part of the body olive-brown and black in the middle, the lower ones cinereous, those of the lower part of the belly and vent edged with rufous; quill-feathers dusky; lower tail-coverts white; tail-feathers short, black, the two middle ones at the tip, the rest edged with ferruginous; legs dusky red. Inhabits watery places in Europe and Asia, and found in our own country; twelve inches long; hides itself among the sedges; runs and swims with celerity, but flies heavily with its legs hanging down; eggs yellowish with dusky brown spots.

3. R. porzana. Spotted gallinule. Two middle tail-feathers edged with white; bill and legs pale olive; irids hazel; head brown, spotted with black; neck above and flanks brown-ash with small white spots; back and wing-coverts olive with black stripes, and near the edges of the feathers with white spots, the greater with white stripes and lines; cheeks, chin, and throat, pale grey, with brown spots; breast brown with white spots; belly varied with cinereous and white; vent ochre yellow. Inhabits Europe and North America, and found in our own country; frequents the sides of small streams, hiding itself among the bushes: nine inches long.

To RA'LLY. *v. a.* (*rallier*, French.) 1. To put di-ordered or dispersed forces into order (*Atterbury*). 2. (*railler*, French.) To treat with slight contempt; to treat with satirical merriment (*Addison*).

To RA'LLY. *v. n.* 1. To come together in a hurry (*Tillotson*). 2. To come again into order (*Dryden*). 3. To exercise satirical merriment.

RALPH (James), a miscellaneous writer, originally a school-master at Philadelphia. He came to London in the beginning of the second George's reign. His Night, a poem, and some theatrical pieces, were received with applause.

His History of England possesses merit, and some of his political pamphlets for a time enjoyed popularity. He died of the gout 1762 at Chiswick. He was one of the heroes of the Dunciad.

RAM, in zoology. See OVIS.

RAM (Battering), in antiquity, a military engine, used to batter down the walls of besieged places. See BATTERING RAM.

RAM'S HEAD, in a ship, is a great block belonging to the fore and main haulyards. It has three shives in it, in which the haulyards are put; and in a hole at the end are reeved the ties.

To RAM. *v. a.* 1. To drive with violence, as with a battering ram (*Bacon*). 2. To fill with any thing driven hard together (*Hayward*).

RA'MAGE. *s.* (from *ramus*, Lat.) Branches of trees.

RAMAH (anc. geog), a town of Benjamin, near Gibea, (Judges), called Rama of Saul (1 Sam. xxii.), six miles from Jerusalem to the north; memorable for the story of the Levite and his concubine; taken and fortified by Baasa, king of Israel, in order to annoy the kingdom of Judah. This Rama is mentioned Isa. x. Jer. xxxi. and Matth. ii. and is to be distinguished from Rama of Samuel, 1 Sam. xix. called also Ramatha, 1 Sam. i. 19. and Ramathaim Zophim, ibid. i. 1. which lay a great way to the west, towards Joppa, near Lydda, 1. Maccab. ii. the birth-place of Samuel; adjoining to the mountains of Ephraim, and the place of his residence, 1 Sam. xv. &c. (Josephus). Called Ramula in the lower age, (Gul. Tyrius). There is here a convent of the Fathers of the Holy Land, inhabited only by Portuguese, Spaniards, and Italians. The streets are narrow, and the houses contemptible; but there are many fine ruins of Christian churches and other buildings, which show what it has been formerly. It is 20 miles W. by N. of Jerusalem. Lon. 34. 55 E. Lat. 32. 0 N.

RAMANAD, a town of Hindustan, in the Carnatic, 54 miles S.W. of Madura, and 88 S. of Tanjore. Lon. 78. 56 W. Lat. 9. 20 N.

RAMANANCOR, an island of Asia, lying toward Cape Comorin. It is 23 miles in circumference; is very sandy, and has only a few villages and a temple. Lon. 79. 45 E. Lat. 9. 25 N.

RAMAZZINI (Bernardin), an Italian physician, born at Carpi, near Modena, in 1633. He studied at Parma, and took there his doctor's degree. In 1682 he became professor of physic at Modena, which office he filled with great credit eighteen years, and then removed to Padua, and in 1708 he was appointed rector of the college. He died in 1714. His works were published at London in 1716, 4to.

To RA'MBLE. *v. n.* (*rammelen*, Dutch.) To rove loosely and irregularly; to wander (*Locke*).

RA'MBLE. *s.* (from the verb.) Wandering; irregular excursion (*Swift*).

RA'MBLER. *s.* Rover; wanderer (*L'Estrange*).

RA'MBOOZE. RA'MBUSE. *s.* A drink made of wine, ale, eggs, and sugar (*Bailey*).

RAMBOUILLET, a town of France, in the department of Seine and Oise. Here was a palace, in which Francis I. died, in 1547, and Lewis XVI. made it a magnificent royal residence; but it was demolished in 1793, by order of the national convention. It is 27 miles S.W. of Paris.

RAMEAU (John Philip), a musician, born at Dijon 1683. He at first travelled with a strolling company, and afterwards was organist of Clermont cathedral in Auvergne. He, studying the principles of his art, produced his treatise on harmony, and his new system of music. In 1750 he published his famous demonstration of the principles of harmony, in which he makes the whole depend on a single and clear principle, the fundamental base, and for this excellent work he has been deservedly called the Newton of that science. He was manager of the opera at Paris, and composer to Lewis XV. who raised him to the rank of nobility. He died at Paris 1764. He was a man of exemplary character, a good husband, and a benevolent neighbour. As a theorist, he is deservedly admired by Handel.

RAMEHEAD, a promontory of Cornwall, S.W. of Plymouth, at the entrance of Plymouth Sound. On its summit is a chapel, (a sea mark) belonging to the village of Rame. Lon. 4. 20 W. Lat. 50. 18 N.

RAMENT, RAMENTUM, in botany. (a radendo, q. rasura.) A small particle of any thing; as gold-dust, saw-dust, or little chips, &c. Applied by Linnéus to the small loose scales that are frequently found on the stems of vegetables.

RAMENTA. The little slips, shreds, or filings of any thing. Raments as above.

RAMERA, a town of France, in the department of Aube, seated on the Aube, 18 miles N.E. of Troyes. Lon. 4. 30 E. Lat. 48. 32 N.

RAMEX. (dim. of *ramus*, a branch, from its protruding like a branch). An hernia.

RAMIFICATION. *s.* (*ramification*, Fr.) 1. A division or separation into branches; the act of branching out (*Hale*). 2. Small branches (*Arbuthnot*).

To RA'MIFY. *v. a.* (*ramifier*, Fr.) To separate into branches (*Boyle*).

To RA'MIFY. *v. n.* To be parted into branches (*Arbuthnot*).

RAMILLIES, a town of Austrian Brabant, remarkable for the great victory obtained by the duke of Marlborough, over the French, on Whitsunday 1706. It is ten miles N. of Namur, and 24 S.E. of Brussels. Lon. 4. 50 E. Lat. 50. 39 N.

RAMLA, a town of Palestine, the ancient Arimathea, now in a ruinous state; it is, however, the residence of a Turkish aga, who has about 200 troops under him. Here is a manufacture of soap, which is sen into all parts o

Egypt. It is 18 miles N.W. of Jerusalem. Lon. 35. 15 E. Lat. 32. 8 N.

RAMMEKENS, a seaport of the island of Walcheren, in the Dutch province of Zealand. It was one of the towns put into the hands of the English, as a security for a loan in the reign of queen Elizabeth. It is four miles S. of Middleburg. Lon. 3. 40 E. Lat. 51. 29 N.

RAMMELSBERG, a lofty, steep, and extensive mountain of Germany, in that part of the Hartz Forest which lies within the principality of Grubenhagen. On this mountain are 12 silver mines; and at the foot of it is seated the city of Goslar.

RA'MMER. *s.* (from *ram.*) 1. An instrument with which any thing is driven hard (*Moxon*). 2. The stick with which the charge is forced into the gun (*Wiseman*).

RA'MMISH. *a.* (from *ram.*) Strong scented.

RA'MOUS. *a.* (from *ramus*, Latin.) Branchy; consisting of branches (*Newton*).

To RAMP. *v. n.* (*ramper*, French.) 1. To leap with violence (*Spenser*). 2. To climb as a plant (*Ray*).

RAMP. *s.* (from the verb.) Leap; spring (*Milton*).

RAMPA'LLIAN. *s.* A mean wretch (*Shakspeare*).

RA'MPANCY. *s.* (from *rampant.*) Prevalence; exuberance (*South*).

RA'MPANT. *a.* (*rampant*, French.) Exuberant; overgrowing restraint (*South*).

RAMPANT, in heraldry, a term applied to a lion, leopard, or other beast that stands on its hind legs, and rears up his fore-feet in the posture of climbing, showing only half his face, as one eye, &c. It is different from saliant, in which the beast seems springing forward, as if making a sally.

RAMPART, in fortification, is an elevation of earth round a place capable of resisting the cannon of an enemy; and formed into bastions, curtins, &c.

To RA'MPART. *To* RA'MPIRE. *v. a.* (from the noun.) To fortify with ramparts (*Hayward*).

RAMPHASTOS. Toucan. In zoology, a genus of the class aves, order picæ. Bill enormous, empty, convex, serrate at the edges; each mandible incurvate at the tip; nostrils behind the base of the bill, long, narrow: tongue feathered at the edges; feet in most species gressorial.

The bill of the toucan has a most grotesque appearance, and has something of the shape of a mask, with a large and long nose, constructed to surprise and frighten children. Nature, wherever we can trace her object, has certainly formed nothing in vain; and hence it becomes us to believe that it is only because we cannot trace her in the present instance, that we do not perceive the object of this apparent deformity. We are nevertheless too apt to reason from our own limited powers alone; and in providing such an enormous beak for a bird of such moderate size, we regret the apparent waste in nature; and our regret is increased on finding, that this disproportionate instrument, instead of being, as it seems to us, of any service to the bird, cramps it in every operation. It is of no use in seizing, cutting, or dividing its food, which the animal is obliged to gobble up in entire lumps, without grinding or breaking. It is still less a weapon of defence, or a counterpoise in flying: on the contrary, it gives the bird a tottering motion that threatens to bring it to the ground, at the time it wishes to rise in the air.

Neither has nature been contented with admitting only one apparent deformity into the structure of this part of her offspring: the prodigal bill of the toucan incloses a tongue apparently as useless and extraordinary. It is not fleshy nor cartilaginous, like that of other birds, but exactly resembles a feather shut up in a large case.

The feathers of the toucan are greatly admired by the Brasilians; they make them up into articles of dress, and wear them only on extraordinary occasions. The feathers of the throat are of a bright and lively orange, and in request in Europe for making muffs. Notwithstanding the deformity of his bill and his tongue, the toucan wears a splendid dress: this circumstance, with his other peculiarities, have procured him the honour of being placed among the constellations of the south.

From the singular conformation of the tongue of these birds one would imagine that they are mute: they make, however, a considerable noise; their long repetition of a hissing sound is often heard at a great distance. The savages attribute great healing virtues to this extraordinary tongue: and employ it as a medicine in almost every disease. The nostrils of this class of birds are almost imperceptible, being concealed among the feathers upon the base of the beak, in most kinds; though in others, discernible upon the naked rostrum. The feet resemble those of the parrot tribe, having two toes before and two behind, but of a disproportionate length. The legs of the toucan are bare of feathers, but covered with scales that feel soft to the touch. These birds are spread over all the warm climates of America; and, being very sensible to cold, never quit them. They remove at different seasons, after ripe fruit, but are rather wanderers than migratory birds. They delight in marshy grounds, and feed principally upon the fruit of the palm tree. They swallow their food whole, their large beak being of no service in breaking it.

Though the toucan perches on the tops of very tall trees, his flight is heavy, and executed seemingly with great effort. Although he is continually in motion, yet his large beak gives him a grave and serious aspect.

The whole of this genus build in the holes of trees, that have been scooped out by the woodpecker: they lay only two eggs. When taken young they are easily tamed; and can be even brought to hatch their eggs within a house. When in their natural state no bird defends its young better: they sit in their cavity, placing

their large rostrum at the entrance; and should the monkey, or any other plunderer approach, he generally meets with such a reception, as prevents him from returning. The hole at which these birds enter is commonly so small, that their large bill nearly fills it; by this means they are more effectually guarded against birds, serpents, and other assailants. There are seventeen species of this genus. The two following are chiefly entitled to our attention:

1. R. tucanus. Yellow-breasted toucan. Blackish; abdominal band, vent and rump yellow; cheeks, chin, and neck orange; legs and claws lead-colour. Inhabits South America: nineteen inches long. Feeds upon pepper, as do several other species of the genus. The natives of Cayenne glue the skin and feathers of the neck of the bird upon their cheeks by way of ornament.

2. R. viridis, Grigri, or green toucan. Green; belly yellow; rump red. Inhabits with the last; fourteen inches long: and, like the last, fond of moist grounds, and plantations of palm trees. The head, throat, and neck are black; the back, wings, and tail, of a dark green, while the breast and belly are yellow. The bill is not of the same monstrous enormity with that of the toucan, being only about four inches and an half in length.

RAMPION, esculent, in botany. See CAMPANULA.

The root of this plant, which is fleshy, is cultivated both in France and in our own country as a salad. It it the rapunculus of Tournefort; the whole plant is full of a milky juice: the root biennial, spindle-shaped, sometimes branching; the skin upright, angular, two feet high, hairy towards the base, smooth above; branches alternate, short, upright; the segments of the calyx are awl-shaped, or setaceous, twice as long as the germ, with a small tooth on each side of the base; the flowers are upright; the corol blueish purple, sometimes very pale purple or whitish; each segment marked with three lines; the nectary fringed. It grows wild in England and France; and flowers in June, July, and August. Among us it is found in its native state in the fallow fields.

RAMSAY, a seaport of the Isle of Man, situate on a large bay, on the N.E. coast, 10 miles N. of Douglas. Lon. 4. 26 W. Lat. 54. 18 N.

RAMSAY (Andrew Michael), a Scotch writer, born at Ayre, in 1686. He studied at Edinburgh, where he became tutor to the son of the earl of Weems. After this he went to Holland to consult the theologians there on religion, but remained in as doubtful a state as before; at length he was converted from deism, by the illustrious Fenelon, in 1709. Through the friendship of this amiable prelate he was made governor to the duke de Charteau Thierry, afterwards prince de Turenne, and a knight of the order of St. Lazarus. He died in 1743 at St. Germain en laye, while in the office of intendant to the duke de Bouillon. He was the author of the travels of Cyrus, and other works.

RAMSAY (Allan), the Scots pastoral poet, was a barber in Edinburgh in the early part of the last century. His taste in poetry, however, has justly raised him to a degree of fame that may in some measure be considered as a recompence for the frowns of fortune. His songs are in universal esteem; as is also the only dramatic performance attributed to him, viz. Patie and Roger, or The Gentle Shepherd, a Scots pastoral. He died in 1763; and was father to the ingenious Mr. Ramsay, a celebrated painter of the present age, and who has likewise distinguished himself by some well-written tracts on various branches of polite literature, particularly the Investigator.

RAMSDEN (Jesse), of Halifax, Yorkshire, was son of a clothier. In 1751, he came to London, to be an engraver, and then applied himself to the making of mathematical instruments. His improvements in the theodolite, the barometer, Hadley's quadrant, and other mathematical and optical instruments were very important to science; and he acquired no little celebrity from his astronomical apparatus, quadrants, &c. He was the inventor of a very ingenious apparatus for dividing mathematical instruments, for which he received 615l. from the Board of Longitude. A description of this contrivance is given under the words RAMSDEN'S *Machine*, in the 2d vol. of Gregory's Mechanics.

RAMSEY, a town in Huntingdonshire, with a market on Saturday. It is seated in the fens, near the meres of Ramsey and Whitlesey; and had formerly a rich and celebrated abbey. It is 12 miles N.E. of Huntingdon, and 69 N. of London. Lon. 0. 19 W. Lat. 52. 26 N.

RAMSEY, an island on the coast of Pembrokeshire, two miles long and one and a half broad. Near it is a group of dangerous rocks, frequented in the breeding season by vast multitudes of sea-fowl, and known by the name of the Bishop and his Clerks. This island is four miles W. of St. David's, and 17 N.W. of Milford Haven. Lon. 5. 20 W. Lat. 51. 55 N.

RAMSGATE, a seaport in Kent, in the isle of Thanet, where two very fine stone piers have been built, for the security of ships, the harbour being near the Downs, between the N. and S. Foreland. Ramsgate has some trade to the Baltic, and is frequented as a bathing-place. It is four miles S. of Margate, 10 E.N.E. of Canterbury, and 73 E.S.E. of London. Lon. 1. 30 E. Lat. 51. 22 N.

RAMSONS, in botany. See ALLIUM.

RAMULE, in botany. (*ramulus*, a branchlet, little branch, or twig.) A subdivision of the branch.

RAMUS, in botany, a branch. Pars caulis. A subdivision of the stem.

RAMUS (Peter), was one of the most famous professors of the 16th century. He was born in Picardy in 1515. A thirst for learning prompted him to go to Paris when very young,

and he was admitted a servant in the college of Navarre. Spending the day in waiting on his masters, and the greatest part of the night in study, he made such surprising progress, that, when he took his master of arts degree, he offered to maintain a quite opposite doctrine to that of Aristotle. This raised him many enemies; and the two first books he published, Institutiones Dialecticæ, and Aristotelicæ Animadversiones, occasioned great disturbances in the university of Paris: and the opposition against him was not a little heightened by his deserting the Romish religion, and professing that of the Reformed.

Ramus also bore a part in a very singular dispute. About the year 1550, the royal professors corrected among other abuses, that which had crept into the pronunciation of the Latin tongue. Some of the clergy followed this regulation; but the Sorbonnists were much offended at it as an innovation, and defended the old pronunciation with great zeal. Things at length were carried so far, that a minister, who had a good living, was very ill treated by them; and caused to be ejected from his benefice for having pronounced *quisquis, quanquam*, according to the new way, instead of *kiskis, kankam*, according to the old. The minister applied to the parliament; and the royal professors, with Ramus among them, fearing he would fall a victim to the credit and authority of the faculty of divines, for presuming to pronounce the Latin tongue according to their regulations, thought it incumbent on them to assist him. Accordingly, they went to the court of justice, and represented in such strong terms the indignity of the prosecution, that the minister was cleared, and every person had the liberty of pronouncing as he pleased.

Ramus was bred up in the Catholic religion, but, as before observed, afterwards deserted it. He began to discover his new principles by removing the images from the chapel of his college of Presle, in 1552. Hereupon such a prosecution was raised against him by the Religionists, as well as Aristotelians, that he was driven out of his professsorship, and obliged to conceal himself. For that purpose, with the king's leave he went to Fontainbleau; where, by the help of books in the king's library, he prosecuted geometrical and astronomical studies. As soon as his enemies found out his retreat, they renewed their persecutions; and he was forced to conceal himself in several other places. In the mean time, his curious and excellent collection of books in the college of Presle was plundered: but after a peace was concluded in 1563, between Charles the 9th and the Protestants, he again took possession of his employment, and maintained himself in it with vigour, and was particularly zealous in promoting the study of the mathematics.

This continued till the second civil war in 1567, when he was forced to leave Paris and shelter himself among the Hugonots, in whose army he was at the battle of St. Denys. Peace having been concluded some months after, he was restored to his professorship; but, foreseeing that the war would soon break out again, he did not care to venture himself in a fresh storm, and therefore obtained the king's leave to visit the universities of Germany. He accordingly undertook this journey in 1568, and received great honours wherever he came. He returned to France, after the third war in 1571; and lost his life miserably, in the massacre of St. Bartholomew's day, 1572, at 57 years of age. It was said that he was concealed in a granary during the tumult; but discovered and dragged out by some peripatetic doctors who hated him; these, after stripping him of all his money under pretence of preserving his life, gave him up to the assassins, who, after cutting his throat and giving him many wounds, threw him out of the window; and his bowels gushing out inthe fall, some Aristotelian scholars, encouraged by their masters, spread them about the streets; then dragged his body in a most ignominious manner, and threw it into the river.

Ramus was a great orator, a man of universal llearning, and endowed with very fine quaities. He was sober, temperate, and chaste. He ate but little, and that of boiled meat; and drank no wine till the latter part of his life, when it was prescribed by the physicians. He lay upon straw; rose early, and studied hard all day; and led a single life with the utmost purity. He was zealous for the protestant religion, but at the same time a little obstinate, and given to contradiction. The protestant ministers did not love him much, for he made himself a kind of head of a party, to change the discipline of the protestant churches: his design was to introduce a democratical government in the church, but this design was traversed, and defeated in a national synod. His sect flourished however for some time afterwards, spreading pretty much in Scotland and England, and still more in Germany.

He published a great many books; but mathematics was chiefly obliged to him. Of this kind, his writings were principally these following:

1. Scholarum Mathematicarum libri 31.

2. Arithmeticæ libri duo.—Algebræ libri duo.—Geometriæ libri 27.

These were greatly enlarged and explained by Schoner, and published in two volumes 4to. There were several editions of them.—The Geometry, which is chiefly practical, was translated into English by William Bedwell, and published in 4to. at London, 1636.

Ramus's merit in his opposition to Aristotle, and his firmness in undermining his authority, is unquestionably great. But it has been doubted, and with much reason, whether he was equally successful in his attempts after a new logical institute. We have the following general outline of his plan in Dr. Enfield's History of Philosophy. "Considering dialectics as the art of deducing conclusions from pre-

mises, he endeavours to improve this art by uniting it with that of rhetoric. Of the several branches of rhetoric, he considers invention and disposition as belonging equally to logic. Making Cicero his chief guide, he divides his treatise on dialectics into two parts, the first of which treats of the invention of arguments, the second of judgments. Arguments he derives not only from what the Aristotelians call middle terms, but from any kind of proposition, which, connected with another, may serve to prove any assertion. Of these he enumerates various kinds. Judgments he divides into axioms, or self-evident propositions, and *dianoëa*, or deductions by means of a series of arguments. Both these he divides into various classes; and illustrates the whole by examples from the ancient orators and poets.

"In the logic of Ramus many things are borrowed from Aristotle, and only appear under new names; and many others are derived from other Grecian sources, particularly from the dialogues of Plato, and the logic of the Stoics. The author has the merit of turning the art of reasoning from the futile speculations of the schools to forensic and common use; but his plan is defective in confining the whole dialectic art to the single object of disputation, and in omitting many things which respect the general culture of the understanding and the investigation of truth. Notwithstanding the defects of his system, we cannot, however, subscribe to the severe censure which has been passed upon Ramus by lord Bacon and others; for much is, we think, due to him for having with so much firmness and perseverance asserted the natural freedom of the human understanding. The logic of Ramus obtained great authority in the schools of Germany, Great Britain, Holland and France; and long and violent contests arose between his followers and those of the Stagyrite, till his fame vanished before that of Descartes."

RAN. The preterit of *run*.

RAN, in the old English writers, means open or public robbery, so manifest as not to be denied. *Ran dicitur aperta rapina quæ negari non potest.* Lamb 125. Leg. Canut. cap. 58. Hence it is now commonly said of one who takes the goods of another injuriously and violently, that he has taken all he could *rap* and *ran*.

RANA. Frog. Toad. In zoology, a genus of the class amphibia, order reptilia. Body four-footed, naked; generally tailless; hind legs longer than the fore. This genus differs from the lacerta, in having a shorter body, broader, thicker head, and in general no tail. They feed on insects, are full grown the fourth year, and seldom live, excepting under particular circumstances, beyond the twelfth; fore-feet mostly cleft, four-toed; hind-feet palmate, five-toed, all without claws; are very salacious, adhering to the female for days, and even weeks; the tadpole is excluded from the egg, without feet, but with a tail resembling a fish's, which drops off as the legs are protruded; while tadpoles these animals have also a sort of gills and subsidiary lungs, and many a small tube on the lower lip by which they can affix themselves to other bodies; or near the left eye a vesicle from which they discharge water. In breeding time the fore-thumb of the male is warty. Toads are filthy in their aspect, and live in damp, obscure, dark places, and crawl out only by night; their eggs are in a long, connected chain. Frogs are more active, more about by day, and lay their eggs in a confused mass. The genus is thus subdivided:

A. Toads. Body warty, puffed up; legs shorter.

B. Frogs. Body more oblong, smooth; legs longer.

C. Hind-feet very long; claws lenticulate.

There are thirty-six species; chiefly natives of Europe and America: four common to our own country. The following are the principal:

1. R. pipa. Surinam toad. Toes of the fore-feet unarmed, four-cleft; of the hind-feet clawed, palmate; head flat, broad, short; beak spatula-shaped; eyes very small and remote; neck very short, wrinkled; body orbicular, flat, black-bay, with a hard cartilaginous skin; fore-toes round, hind very long. Inhabits the waters of Guiana, and is eaten by the natives. In this extraordinary animal the male, after the exclusion of the eggs, collects the mass together and smears it over the back of the female with its paws, where they are received into cellules upon the back, impregnated by the male and closed up: after some time, (about three months), the perfect young are extruded from these hollow tubercles on the back of the female, without gills, and, at first, without tails; the tails are produced soon after, and when the animal is perfected, drop off.

2. R. musica. Musical toad. Shoulders gibbous, dotted; body varied with lurid and brown; fore-feet cleft; hind-feet subpalmate, five-toed, with hardly any claws. Inhabits fresh waters in Surinam; larger than the common toad: in the evening and during the whole night makes a musical kind of croaking.

3. R. bufo. Common toad. Body lurid, brown. Three other varieties.

β. Body olive: an unequal yellowish red band down the side.

γ. Body with confluent green spots and warts on the spots of the same colour, those of the intervals red; the spaces between bicoloured.

δ. Much less in size.

Inhabits the woods and shady damp places of Europe; lives during spring and summer in shallow stagnant water; in winter in muddy places, and not unfrequently in holes of its own digging, feeds by night on various insects: is so tenacious of life that it has been found alive inclosed in rocks and in the center of stone walls, in which places it must have existed for nearly half a century: is domesticated by the natives of Ucrania; and has been once or twice domesticated in our own country, and found to

live upwards of forty years. It is devoured by the eagle and hawk tribes. Its slimy and frothy discharge secreted on being disturbed does not appear to be poisonous to man or any of the larger animals, although the smaller lizards are said on biting toads to be paralytic for some time afterwards. The common toad may, upon the whole, be regarded as an animal perfectly innoxious.

4. R. rubeta. Natter jack. Vent obtuse; a yellow line on the back; body beneath spotted with black; body above dirty yellow, clouded with brown and covered with porous pimples of unequal sizes. Inhabits dry sandy places of Europe; appears in the evening, especially after showers, and is the species which has been supposed to have been rained down; is of quicker motion than the last: two and a quarter inches long, one and a quarter broad.

5. R. rombina. Laughing toad. Belly orange, spotted with sky-blue. Three other varieties.

6. Belly black, with clear white spots and points.

γ. Brown; with white spots; sides and round the joints red.

δ. With a very loud sonorous voice.

Inhabits fenny places in Germany and Helvetia; leaps like a frog; emits a clear sound like a man laughing; resembles the common toad, but is small, black, and everywhere rough; with dots on the upper part and variegated beneath, with a transverse wrinkle under the neck.

6. R. cornuta. Horned toad. Eye-lids horned; head large, rounded before; mouth excessively large; eye-lids soft, mucronate, trifid at the point, the eyes seated in the middle; body greenish-brown, with broad, longitudinal whitish stripes on the back; legs transversely fasciate with brown; when full grown the back, thighs, and vent are spiny. Inhabits Virginia and Surinam: of all animals this appears to be the most hideous and deformed.

7. R. ridibunda. Jocular toad. Body brown; spotted above with cinereous; dorsal line yellow or greenish; beneath smooth, whitish; haunches brown, spotted with milk-white. Found in great numbers near the rivers which empty themselves into the Caspian sea; never ventures on dry land; is very large, and oftenweighs more than half a pound: resembles the common frog, but broader and shorter: its voice in the evening is like a man laughing.

8. R. variabilis. Changeable toad. Colour variable; back and sides gibbous; warts yellowish in the centre, very small on the middle of the back, and larger on the most prominent part of the flanks. Inhabits shady places in lower Germany; above two inches long; in its manners holds an intermediate rank between the toad and frog, when full awake the body is white with green spots; in the heat of the sun entirely cinereous; when asleep the spots only are cinereous; and when torpid the body is flesh-colour.

9 R. pipiens. Clamorous frog. Green; with numerous ocellate spots, surrounded with a yellowish ring: ears, in the living animal, of a shining golden colour; region of the arms wrinkled. Inhabits running waters in North America; from the mouth to the end of the feet from five to six inches long; during the spring, and especially by night, or on the approach of a storm makes a continually clamorous noise; takes prodigious leaps.

10. R. temporaria. Common frog. Back flattish, subangular. Another variety, above dirty olive, with large warty spots, the head above plain, beneath whitish; twice the size of the common frog. The first inhabits Europe, the second Persia. This species lives during spring in the water among toads, in summer on land, at which time it is silent; feeds on various insects; and is the prey of ducks and cranes; croaks when in muddy ditches. The second in its croaking at night makes a noise like an angry man.

11. R. esculenta. Esculent frog. Body angular; back transversely gibbous; belly marginate. Inhabits the fens and waters of Europe: the male makes a continual croaking in an evening, especially before rain, with the angles of the mouth distended in a globular form: when irritated will pursue and destroy a pike. It is a voracious animal, and will frequently seize on young birds of various kinds, mice, and even ducklings, swallowing them whole.

12. R. paradoxica. Paradoxical frog. Thighs obliquely streaked behind; body pale yellow with ochre-colour spots: fore-feet four-toed, not webbed; hind-feet five-toed, palmate, with the rudiments of a sixth. Inhabits South America. The tail of this animal in the tadpole state is very large, fleshy, two-edged, and has given rise to the opinion that it gradually became a fish, and afterwards changed to a frog: but like the rest of its tribe it gradually drops its branchial fins and tail, and thus arrives at its perfect frog-state.

13. R. arborea. Tree-frog. Body green; beneath whitish, granulate; feet cleft; on each side a yellow curved line. Five or six other varieties, chiefly from variety of colour. Inhabits Europe and America; lives under the foliage of trees, and adheres strongly to the leaves by means of a mucus upon its orbicular flattened claws; feeds on insects; frequently changes its colours; the male in breeding time has an orbicular gular pouch, at which season and before storms it is much inflated. See Nat. Hist. pl. CLXXI.

RANAI, one of the Sandwich islands, in the N. Pacific Ocean, lying S.W. of the passage between Mowee and Morotoi, about three leagues from each. The S. part is high and craggy; but the other parts have a better aspect, and are well inhabited. It produces very few plantains and bread fruit trees, but abounds in yams, sweet potatoes, and taro.

RANATRA, in the entomology of Fabricius a tribe of the hemipterous genus NEPA, which see.

RANC or RANS (John), a painter, born

Rana.



R. Paradoxica or Paradoxical Frog.



R. Cornuta or Horned Toad.

London, Published by Sherwood & Cº Paternoster Row, July 1ˢᵗ 1812.

at Montpelier in 1674, died at Madrid 1735. He was a scholar of Rigaud, whose niece he espoused. He obtained great reputation by his talent for portrait painting; and was received in the academy of painting in 1703, and appointed in 1724 first painter to the king of Spain.

To RANCH. *v. a.* (from *wrench.*) To sprain; to injure with violent contortion (*Garth*).

RA'NCID. *a.* (*rancidus*, Latin.) Strong scented (*Arbuthnot*).

RANCID. Oily substances are said to have become rancid when by keeping they acquire a strong offensive smell, and altered taste. For the cause and means of correction, see BUTTER.

RANCIDITY. Oils of all kinds contain a certain portion of acid, which, from the term *sebum*, which is Latin for fat, is, in modern chemistry, denominated sebacic acid. This acid is so ultimately united with oily base, and especially in butter, fat, and other fixed oils, that none of its properties are discoverable when fresh. But when, by a sufficient degree of heat, a decomposition has taken place, the acid is extricated, the properties of the fixed oil are changed, and it becomes sharp and irritating. The same effect takes place, moreover, when fat or other fixed oil has been for some time exposed to the atmosphere; in which case a partial decomposition ensues, a small portion of the acid is set at liberty, the colour becomes brownish or yellowish, and the taste and smell are sharpish and disagreeable: this property of the fixed oils is denominated rancidity: and during its existence these oils evince a difference in their chemical powers; for alcohol that, in their mild state, had no effect upon them, now dissolves the rancid part, though it still leaves the rest untouched. De Machy, a Parisian chemist, has therefore very properly observed, that by means of washing in alkohol fat may be deprived of all its rancid part, and have the rest of it rendered sweet. Pœrner purposes, as a more economical plan, to deprive it of this rancidity by mixing and boiling it with fresh spring water, to skim it, and repeat the operation. Macquer proposes to add a little calcareous earth or alkali to the water, the better to absorb the rancid acid, and afterwards carries off, by edulcoration with a large quantity of pure water, all the saline or soapy matter that may have been formed.

From such observations Morveau has no doubt that the developed acid puts the oil, now no longer a perfect fat, into a state of soap; since otherwise it could not be extracted by water alone, whilst the properties of the unchanged fat would to a certain point be altered. Fourcroy is of opinion, that this change in fat arises from the fermentation of a peculiar animal mucilage, of which fat always retains a certain portion intimately combined with it, and that the rancidity proceeds from the escape of fixed air. On this supposition the addition of fixed air must correct the rancid property; and Siessert informs us, this was actually accomplished by mixing sweet fruits or honey with rancid oils, so as to occasion a fermentation and production of fixed air, by which means their proper gass is restored to them. Rozier and Œttinger have confirmed this observation, and have even corrected and meliorated fat, and rendered it sweeter and firmer byputting apples or other fruits into the pot in which it was melted. Rozier even recommends a sponge to be dipped in a mixture of alum and chalk, and to be placed at the bottom of the oil-vessel, by which means the acid of the alum will extricate the fixed air from the chalk which will mix with the oil. Morveau himself, indeed, is not far from admitting a kind of fermentation in fat: that is, a more or less sensible motion, determined by the affinities of the air and the heat, producing new combinations. In short, he thinks it very probable that oils change in the manner acids do: that a new portion of the acidifying principle unites to them in the same way, which last is proved from the experiments of Hasse; and Scheele precisely says that the air is diminished by oils which become resinous.

Morveau, however, confesses that much is wanting to conciliate this theory with all the phænomena. For he observes, 1st, that it supposes an animalization in fat which is opposed by facts. 2dly. Recent fat, distilled in close vessels, undergoes a change perfectly analogous; some developed acid is in like manner formed; and hence it must be acknowledged that the acidifying principle pre-existed in the fat; that it was there in sufficient quantity instantly to produce the change which the access of air occasions in a length of time; or it must be said with the celebrated Scheele, that the vital air may proceed here from the decomposition of the matter of heat. Fat is also soluble in alcohol, after it has been precipitated from soap by means of acids.

It would be of use to examine what influence the sweet saccharine matter which Scheele found in oils has upon their rancidity. It is said that if fat or butter be boiled with half the weight of litharge in water to the consistence of an ointment, the water becomes sweet, and by evaporation may be converted into a syrup. This syrup is pure, and contains nothing but saccharine matter if the oil be mild, but if rancid, a little of the litharge, which however may be precipitated by vitriolic acid. By a stronger heat an inflammable vapour arises; and in order to be forced over it requires the boiling heat of oil of vitriol. In this state it is found partly undecomposed, having its sweet taste while the other part is empyreumatic, and is converted into a brown oil with a smell of alcohol; a light spongy coal remains, containing the calx of lead.

RA'NCIDNESS. RANCI'DITY. *s.* (from *rancid.*) Strong scent, as of old oil.

RA'NCOROUS. *a.* (from *rancour.*) Malignant; malicious; spiteful in the utmost degree (*Shakspeare*).

RA'NCOUR. *s.* (*rancoeur*, old French.) 1. Inveterate malignity; malice; steadfast impla-

ability; standing hate (*Spenser*). 2. Virulence; corruption (*Shakspeare*).

RAND. *s.* (*rand*, Dutch.) Border; seam.

RANDALSTOWN, a borough of Ireland, in the county of Antrim, four miles W.N.W. of Antrim.

RANDERADT, a town of Westphalia, in the duchy of Juliers, 10 miles N.W. of Juliers. Lon. 6. 30 E. Lat. 51. 5 N.

RANDIA, in botany. See GARDENIA.

RA'NDOM. *s.* (*randon*, Fr.) Want of direction; want of rule or method; chance; hazard; roving motion (*Milton*).

RA'NDOM. *a.* Done by chance; roving without direction (*Dryden*).

RANDOM-SHOT, is a shot discharged with the axis of the gun elevated above the horizontal or point-blank direction.

RANDOM, of a shot, also sometimes means the range of it, or the distance to which it goes at the first graze, or where it strikes the ground. See RANGE.

RANG. The preterit of *ring*.

To RANGE. *v. a.* (*ranger*, French.) 1. To place in order; to put in ranks (*Clarendon*). 2. To rove over (*Gay*).

To RANGE. *v. n.* 1. To rove at large (*Milton*). 2. To be placed in order (*Shakspeare*). 3. To lie in a particular direction (*Drayton*).

RANGE. *s.* (*rangée*, French.) 1. A rank; any thing placed in a line (*Newton*). 2. A class; an order (*Hale*). 3. Excursion; wandering (*South*). 4. Room for excursion (*Addison*). 5. Compass taken in by any thing excursive, extended, or ranked in order (*Pope*). 6. Step of a ladder (*Clarendon*). 7. A kitchen grate (*Spenser*).

RANGE, in gunnery, sometimes means the path a shot flies in. But more usually,

Range now means the distance to which the shot flies when it strikes the ground or other object, called also the amplitude of the shot. But range is the term in present use.

Were it not for the resistance of the air, the greatest range, on a horizontal plane, would be when the shot is discharged at an angle of 45° above the horizon; and all other ranges would be the less, the more the angle of elevation is above or below 45°; but so as that at equal distances above and below 45°, the two rangers are equal to each other. See GUNNERY and PROJECTILES.

RA'NGER. *s.* (from *range*.) 1. One that ranges; a rover; a robber (*Spenser*). 2. A dog that beats the ground (*Gay*). 3. An officer who tends the game of a forest.

RANGAMATTY, a town of Hindustan, capital of a circar in Bengal. It has a celebrated pagoda, and stands near the Burrampooter, on the confines of Assam and Bootan, 170 miles N.E. of Moorshedabad. Lon. 90. 8 E. Lat. 26. 10 N.

RANGOON, a seaport of Pegu, and the principal mart for teak timber, in the Birman empire. It was founded by Alompro, king of Birmah, in 1755; and is the residence of a governor, who lives within the fort. Here is a custom-house built of brick, but the wharfs and dwelling-houses are all constructed of wood. In its neighbourhood are numerous convents, and two miles N. of the town, on a rocky eminence, is a very grand temple, which is a splendid object at the distance of many miles. Rangoon is seated on the most eastern branch of the Irrawaddy (which hence to the sea is called the Rangoon or Syriam river) 18 miles N. of its mouth, and 60 S. of Pegu. Lon. 96. 10 E. Lat 26. 48 N.

RANINE ARTERY. Arteria ranina. Sublingual artery. The second branch of the external carotid.

RANK. *a.* (nanc, Saxon.) 1. High-growing; strong; luxuriant (*Spenser*). 2. Fruitful; bearing strong plants (*Sandys*). 3. (*rancidus*, Latin.) Strong scented; rancid (*Shakspeare*). 4. High tasted; strong in quality (*Ray*). 5. Rampant; highgrown (*Shakspeare*) 6. Gross; coarse (*Swift*). 7. The iron of a plane is set *rank*, when its edge stands so flat below the sole of the plane, that it will take off a thick shaving (*Moxon*).

RANK. *s.* (*range*, French.) 1. Line of men placed abreast (*Shakspeare*). 2. A row (*Milton*). 3. Range of subordination (*Locke*). 4. Class; order (*Atterbury*). 5. Degree of dignity or excellence (*Addison*). 6. Dignity; high place: as, *he is a man of* rank.

To RANK. *v. a.* (*ranger*, French.) 1. To place abreast (*Milton*). 2. To range in any particular class (*Shakspeare*). 3. To arrange methodically (*Milton*).

To RANK. *v. n.* To be ranged; to be placed (*Tate*).

RANK and PRECEDENCE, in the army and navy, are as follow:

RANK (Engineers'). Chief, as colonel; director, as lieutenant-colonel; sub-director, as major; engineer in ordinary, as captain; engineer extraordinary, as captain-lieutenant; sub-engineer, as lieutenant; practitioner engineer, as ensign.

RANK (Navy). Admiral, or commander in chief of his majesty's fleet, has the rank of a field-marshal; admirals with their flags on the main-top-mast-head, rank with generals of horse and foot; vice-admirals, with lieutenant-generals; rear-admirals, as major-generals; commodores, with broad pendants, as brigadier-generals; captains of post-ships, after three-years from the date of their first commission, as colonels; other captains, as commanding post-ships, as lieutenant-colonels; captains, not taking post, as majors; lieutenants, as captains.

RANK between the Army, Navy, and Governors.

ARMY.	NAVY.	GOVERNORS.
General in chief	Admiral in chief	Commander in chief of the forces in America
Generals of horse	Admiral with a flag at the main-top-mast	Captain-general of provinces
Lieutenant-generals	Vice-admirals	Lieutenant-generals of provinces
Major-generals	Rear-admirals	Lieutenant-governors and presidents
Colonels	Post-captains of 3 years	Lieutenant-governors not commanding
Lieutenant-colonels	Post-captains	Governors of charter colonies
Majors	Captains	Deputy-governors
Captains	Lieutenants	Established by the king, 1760

To RA'NKLE. *v. n.* (from *rank.*) To fester; to breed corruption; to be inflamed in body or mind (*Sandys*).

RA'NKLY. *ad.* (from *rank.*) Coarsely; grossly (*Shakspeare*).

RA'NKNESS. *s.* (from *rank.*) Exuberance; superfluity of growth (*Shakspeare*).

RA'NNY. *s.* The shrewmouse (*Brown*).

RANNEQUIN (N.), an engineer of Liege, 1648, known for the machine of Marly which raised water to the top of a hill 502 feet above its level, with such power that not less than 5258 tons are forced up every 24 hours. He died 1708.

RANNOCH (Loch), a lake of Scotland, in the N. part of Perthshire, 11 miles in length. It receives the waters of Loch Ericht, from the N. and communicates with Loch Tumel on the E. and Loch Lidoch on the W. On its S. side is a forest of birch and pine.

RANS (Bertrand de), of Rheims, after living as a hermit in the forest of Parthenay and Tournay, imposed himself in 1226 upon the credulity of the people as the emperor Baldwin I. of Constantinople, who about 20 years before had been defeated by the Bulgarians, and put to death. Though the daughter of Baldwin discovered his artifice, the imposture prevailed, and Rans was acknowledged by the Flemish as lawful sovereign. At last the usurper was seized, and, confessing his guilt, was hanged at Lisle.

To RA'NSACK. *v. a.* (pan, Saxon, and *saka*, Swedish, to search for or seize.) 1. To plunder; to pillage (*Dryden*). 2. To search narrowly (*Woodward*). 3. To violate; to deflour (*Spenser*).

RANS DES VACHES. An air of much celebrity among the Swiss; and performed by their young herdsmen on the bag-pipe, while they watch their flocks on the mountains.

RA'NSOME. *s.* (*rançon*, Fr.) Price paid for redemption from captivity or punishment (*Tillotson*).

To RA'NSOME. *v. a.* (*rançonner*, Fr.) To redeem from captivity or punishment (*Milton*).

RA'NSOMELESS. *a.* (from *ransome.*) Free from ransome (*Shakspeare*).

RA'NSOMER. *s.* (from *ransome.*) One that redeems.

To RANT. *v. n.* (*randen*, Dutch.) To rave in violent or high sounding language (*Shakspeare*).

RANT. *s.* (from the verb.) High sounding language (*Granville*).

RANTAMPOUR, a town and fortress of Hindustan, capital of a circar of the same name, in the country of Agimere. It is 96 miles E. of Agimere, and 105 W.S.W. of Agra. Lon. 76. 57 E. Lat. 26. 35 N.

RA'NTER. *s.* (from *rant.*) A ranting fellow.

RA'NTIPOLE. *a.* Wild; roving; rakish.

To RA'NTIPOLE. *v. n.* To run about wildly. A low word (*Arbuthnot*).

RANTZAN (Josias), of Holstein, left the Danish service for the French, and was made marshal by Lewis XIII. He lost an eye 1636 at Dole, and afterwards an arm, a leg, and one of his ears. In 1645 he became a protestant, and died five years after in prison. He is known as the active instrument by whom the protestant religion was established in Denmark.

RANULA. (from *rana*, a frog; so called from its resemblance to a frog, or because it makes the patient croak like a frog.) An inflammatory or indolent tumour under the tongue. These tumours are of various sizes and degrees of consistence, seated on either side of the frænum. Children, as well as adults, are sometimes affected with tumors of this kind; in the former they impede the action of sucking; in the latter, of mastication, and even speech. The contents of them are various; in some, they resemble the saliva, in others, the glairy matter found in the cells of swelled joints. Sometimes, it is said that a fatty matter has been found in them; but from the nature and structure of the parts, we are

sure that this can seldom happen; and in by far the greatest number of cases we find that the contents resemble the saliva itself. This, indeed, might naturally be expected, for the cause of these tumours is universally to be looked for in an obstruction of the salivary ducts. Obstructions here may arise from a cold, inflammation, violent fits of the tooth-ach, attended with swelling in the inside of the mouth; and in not a few cases we find the ducts obstructed by a stony matter, seemingly separated from the saliva, as the calculous matter is from the urine; but where inflammation has been the cause, we always find matter mixed with the other contents of the tumor. As these tumors are not usually attended with much pain, they are sometimes neglected, till they burst of themselves, which they commonly do when arrived at the bulk of a large nut. As they were produced originally from an obstruction in the salivary duct, and this obstruction cannot be removed by the bursting of the tumour, it thence happens that they leave an ulcer extremely difficult to heal, nay, which cannot be healed at all till the cause is removed.

RANUNCULUS. Crow-foot; butter-cups; butter-flower. In botany, a genus of the class polyandria, order polygynia. Calyx five-leaved; petals from five to eight with a melliferous pore on the inside of the claw of each; seeds naked. Fifty-nine species, scattered over the globe; fifteen indigenous to our own country. The following are the chief.

1. R. Asiaticus. Persian crow-foot; garden ranunculus. Upright, branched stem, pubescent, round; leaves ternate and twice ternate; leaflets trifid, cut; stem branched towards the bottom; flowers terminal, with the stem naked for a considerable length below them: varies much in size and colour; the petals frequently of different colours on the two surfaces: appear in May, may be protracted in the shade for a month; seeds ripe in July. A native of Asia and the Levant. The varieties are exceedingly numerous, and partitioned into two sections, the old Turkey, and the Persian; the varieties of the latter amounting to many hundreds, and much richer and more beautiful than those of the preceding.

2. R. aconiti folius. Aconite-leaved crow-foot or ranunculus. A very handsome plant; three or four feet high, and branchy; stem hollow; leaves five-lobed, toothed, with the lobes pointed; the middle lobes three-cleft; upper floral leaves in finger-like, sessile, lanceolate divisions; flower white, terminal on each branch. A native of the Alps.

3. R. repens. Creeping crow-foot. Perennial root with numerous whitish fibres; stems several from one root, a foot long, beset with numerous hairs, throwing out long creeping runners; leaves compound, uppermost very entire; flowering stems erect, branched, leafy, generally supporting two flowers. Flowers in June. Found wild in our own meadows. There is a variety cultivated in the gardens with double flowers.

4. R. amplexicaulis. Embracing-leaved crow-foot. Leaves partly surround the stalk at their base, whence the trivial name; of a grayer or more glaucous hue than most of the other species; which, joined to the delicate whiteness of the flower, gives it a peculiar grace, in the midst of other hardy herbaceous plants. A native of the Appenines and Pyrennees. Flowers in April and May.

5. R. acris. Upright meadow crow-foot. Root perennial, tuberose, with many long simple white fibres; stem upright, two feet high, round, hollow, hairy, not very leafy, branchy at top; calyx spreading; peduncles round; leaves three-parted, in many segments; the upper linear. Found wild in our own meadows; flowers in June and July.

There is a variety with double flowers, chiefly cultivated in the gardens, and known by the name of yellow bachelor's buttons.

This, and some other species of ranunculus, have, for medical purposes, been chiefly employed externally as a vesicatory, and are said to have the advantage of a common blistering plaster, in producing a quicker effect, and never causing strangury; but, on the other hand, it has been observed, that the ranunculus is less certain in its operation, and that it sometimes occasions ulcers, which prove very troublesome and difficult to heal. Therefore their use seems to be applicable only to certain fixed pains, and such complaints as require a long continued topical stimulus or discharge from the part, in the way of an issue, which, in various cases, has been found to be a powerful remedy.

On being chewed, they corrode the tongue; and, if taken into the stomach, bring on all the deleterious effects of an acrid poison. The corrosive acrimony which this family of plants possesses was not unknown to the ancients, as appears from the writings of Dioscorides; but its nature and extent had never been investigated by experiments, before those instituted by C. Krapf, at Vienna, by which we learn, that the most virulent of the Linnéan species of ranunculus are the bulbosus, sceleratus, acris, arvensis, thora, and illyricus.

The effects of these were tried either upon himself or upon dogs, and show, that the acrimony of the different species is often confined to certain parts of the plant, manifesting itself either in the roots, stalks, leaves, flowers, or buds; the expressed juice, extract, decoction, and infusion of the plants were also subjected to experiments. In addition to these species mentioned by Krapf, we may also notice the ranunculus fammula, and especially the ranunculus alpestris, which, according to Haller, is the most acrid of this genus. Mr. Curtis observes, that even pulling up the ranunculus acris, the common meadow species, which possesses the active principle of this tribe in a very considerable degree throughout the whole herb, and carrying it to some little distance, excited a considerable inflammation in the palm of the hand in which it was held. It is necessary to remark, that the acrimonious quality of these plants is not of a fixed nature; for it may

be completely dissipated by heat; and the plant, on being thoroughly dried, becomes perfectly bland. Krapf attempted to counteract this venomous acrimony of the ranunculus by means of various other vegetables, none of which was found to answer the purpose, though he thought that the juice of sorrel, and that of unripe currants, had some effect in this way; yet these were much less availing than water; while vinegar, honey, sugar, wine, spirit, mineral acids, oil of tartar, p. d. and other sapid substances, manifestly rendered the acrimony more corrosive. It may be also noticed, that the virulency of most of the plants of this genus depends much upon the situation in which they grow, and is greatly diminished in the cultivated plant. The ranunculus acris is more generally known in the pharmacopœias by the name of ranunculus pratensis.

6. R. flammula. Leaves ovate-lanceolate, petioled; stem declining. This species also forms an article in some pharmacopœias under the specific name of FLAMMULA, which see. It grows wild in the wet marshes of our own country.

7. R. ficaria. Pile-wort. Found wild in our hedges; and known for its medical properties in the dispensatories under the name of CHELEDONIUM MINUS, which see.

8. R. sceleratus. Water-crow-foot. Found in marshy places in our own country and other parts of Europe, and employed in the dispensaries under the name of ranunculus palustris. Its leaves are so extremely acrid that the beggars in Switzerland are said, by rubbing their legs with them, to produce a very fetid and acrimonious ulceration.

The first sort and its varieties may be readily increased by offsets taken from the roots, and new varieties may be raised from the seeds. The roots should be planted early in the spring; February, if the weather be fine, is the best month.

For the second sort the seeds should be made use of in preference to any other method; and they should be collected from the best plants of the semi-double kinds, and be sown in flat pans or boxes filled with light rich earth in August.

The other species may be easily propagated by roots, which should be slipped or parted in autumn when the plants have done flowering, or in the spring before they begin to shoot.

RANUNCULUS ALBUS. The name given in the pharmacopœias to the ANEMONE NEMEROSA, which see. The bruised leaves and flowers are said to cure tinea capitis applied to the part. It is said that the Kamschadales poison their arrows with the juice of its root.

RANUNCULUS GLOBE. See TROLLIUS.

To RAP. *v. n.* (hpæppan, Saxon.) 1. To strike with a quick smart blow (*Prior*). 2. *To* RAP *out*. To utter with hasty violence (*Addison*).

To RAP. *v. a.* (from *rapio extra se*, Latin.) 1. To affect with rapture; to strike with ecstacy: to hurry out of himself (*Pope*). 2. To snatch away (*Milton*). 3. To seize by violence (*Drayton*). 4. To exchange; to truck. A low word.

To RAP *and rend*. To seize by violence. See RAN.

RAP. *s.* (from the verb.) A quick smart blow (*Arbuthnot*).

RAPA'CIOUS. *a.* (*rapace*, French; *rapax*, Lat.) Given to plunder; seizing by violence (*Pope*).

RAPA'CIOUSLY. *ad.* (from *rapacious*.) By rapine; by violent robbery.

RAPA'CIOUSNESS. *s.* (from *rapacious*.) The quality of being rapacious.

RAPA'CITY. *s.* (*rapacité*, Fr. *rapacitas*, Latin.) Addictedness to plunder; exercise of plunder; ravenousness (*Sprat*).

RAPE. *s.* (*raptus*, Lat.) 1. Violent defloration of chastity (*Shakspeare*). 2. Privation; act of taking away (*Chapman*.) 3. Something snatched away (*Sandys*). 4. Fruit plucked from the cluster (*Ray*).

RAPE OF WOMEN, is where a man has carnal knowledge of a woman by force, and against her will, which is by our law a capital felony, and subjects the offender to the punishment of death, which is never remitted. By 18 Elizabeth, c. 7, if any person shall, unlawfully and carnally, know and abuse any woman child under the age of ten years, whether with her consent or against it, he shall be punished as for a rape. And it is not a sufficient excuse in the ravisher to prove that she is a common strumpet; for she is still under the protection of the law, and may not be forced. Nor is the offence of a rape mitigated, by showing that the woman at last yielded to the violence, if such her consent were forced by fear of death or duress; nor is it any excuse that she consented after the fact.

The civilians make another kind of rape, called rape of subordination or seduction; which is seducing a maid either to uncleanness or marriage, and that by gentle means, provided there is a considerable disparity in the age and circumstances of the parties.

RAPE is also a name given to a division of a county, and sometimes means the same as a hundred, and at other times signifies a division consisting of several hundreds; thus Sussex is divided into six rapes, every one of which, besides its hundreds, has a castle, a river, and a forest, belonging to it. The like parts in other counties are called tithings, lathes, or wapentakes.

RAPE, in botany, a species of BRASSICA, which see.

RAPHAEL (Sanzio), an illustrious painter, born at Urbino 1483. His father was a painter, and under him and Perugino he cultivated his talents, after which he visited Siena and Florence, to see the works of Leonardo da Vinci, and Michael Angelo. By studying the best masters he rose to eminence, and merited the appellation of the divine. He also excelled as an architect, and was employed by Leo X. in the building of St. Peter's at Rome, and he enjoyed also the esteem of Francis I. of France,

and of other princes. He unfortunately was too much given to licentious pleasures, which at last hurried him to an untimely grave 1520. He was buried in the Rotunda at Rome. He surpassed, says a connoisseur, all modern painters, because he possessed more of the excellent parts of painting, and above all he possessed the graces in so advantageous a manner, that he has never since been equalled by any other. For an account of his celebrated cartoons, see CARTOONS.

RAPHANIA. (from *raphanus*, the radish or sharlock; because the disease is said to be produced by eating the seeds of that plant.) A genus of diseases in the class neuroses and order spasmi of Cullen; characterized by a spasmodic contraction of the joints, with convulsive motions, and a most violent pain returning at various periods. It begins with cold chills and lassitude, pain in the head, anxiety about the præcordia. These symptoms are followed by spasmodic twitchings in the tendons of the fingers and of the feet, discernible to the eye, heat, fever, stupor, delirium, sense of suffocation, aphonia, and horrid convulsions of the limbs. After these, vomiting and diarrhœa come on, with a discharge of worms. About the eleventh or the twentieth day copious sweats succeed, or purple exanthemata, or tabes, or rigidity of all the joints.

RAPHANUS. Radish. In botany, a genus of the class tetradynamia, order siliquosa. Silique cylindrical, swelling at the seeds, somewhat jointed; glands two between the shorter stamens and the pistil, and two between the longer stamens and the calyx; calyx closed. Eight species, scattered over the globe; of which one is a native of our own country. We shall notice two.

1. R. sativus. Common garden radish. Leaves lyrate; siliques cylindrical, swelling into knobs, two-celled. A native of China. Three varieties, as follow.

α. Common radish; root long.

β. Turnip-rooted radish; root orbicular, white.

γ. Black Spanish radish; root orbicular, black.

These are raised from seeds by different sowings from the end of October till April or May: they should have a light fine mould, and the more early sowings be made on borders, under warm walls, or in similar places, and in frames covered by glasses.

2. R. raphanistrum. Leaves lyrate; siliques cylindrical, jointed, smooth, one-celled. Found wild in our corn fields.

RAPHANUS RUSTICANUS. (ραφανος, παρα το ραδιως φαινεσθαι, from its quick growth.) Armoracia. Horse-radish. The plant which affords this root is the cochlearia armoracia; foliis radicalibus lanceolatis crenatis, caulinis incisis of Linnéus; class tetradynamia, order siliculosa. Horse-radish has long been received into the materia medica, is also well known at our tables. It affects the organs both of taste and smell with a quick penetrating pungency; nevertheless it contains in certain vessels a sweet juice, which sometimes exudes in little drops upon the surface. Its pungent matter is of a very volatile kind, being totally dissipated in drying, and carried off in evaporation, or distillation by water, and rectified as the pungency exhales, the sweet matter of the root becomes more sensible, though this also is, in a great measure, dissipated or destroyed. It impregnates both water and spirit, by infusion or by distillation, very richly with its active matters. In distillation with water it yields a small quantity of essential oil, exceedingly penetrating and pungent.

Dr. Cullen has mentioned every thing necessary to be known respecting the medicinal virtues of horse-radish, we shall therefore transcribe all that the ingenious professor has written on this subject. "The root of this only is employed; and it affords one of the most acrid substances of this order (*siliquosæ*), and therefore proves a powerful stimulant, whether externally or internally employed. Externally, it readily inflames the skin, and proves a rubefacient that may be employed with advantage in palsy and rheumatism; and, if its application be long continued, it produces blisters. Taken internally, Dr. Cullen says it may be so managed as to relieve hoarseness, by acting on the fauces. Received into the stomach, it stimulates this, and promotes digestion; and therefore is properly employed as a condiment with our animal food. If it be infused in water, and a portion of this infusion be taken with a large draught of warm water, it readily proves emetic, and may either be employed by itself to excite vomiting, or to assist the operation of other emetics. Infused in water, and taken into the stomach, it proves stimulant to the nervous system, and is thereby useful in palsy; and, if employed in large quantity, it proves heating to the whole body; and hereby it proves often useful in chronic rheumatism, whether arising from scurvy or other causes. Bergius has given us a particular method of exhibiting this root, which is, by cutting it down, without bruising, into small pieces, and these, if swallowed without chewing, may be taken down in large quantities, to that of a table-spoonful. And the author alleges, that, in this way, taken in the morning for a month together, this root has been extremely useful in arthritic cases; which, however, were probably of the rheumatic kind. It would seem, in this manner employed, analogous to the use of unbruised mustard seed; it gives out in the stomach its subtle volatile parts, that stimulate considerably without inflaming. "The matter of horse-radish, like the same matter of the other siliquose plants carried into the blood-vessels, passes readily into the kidnies, and proves a powerful diuretic, and is therefore useful in dropsy". See ARMORACIA.

RAPHE. (ραφη, a suture.) In anatomy. The rough eminence which divides the scrotum, as it were, in two. It proceeds from the root of the penis inferiorly towards the perinæum.

RAPHE CEREBRI. The longitudinal emi-

nence of the corpus callosum of the brain is so called, because it appears somewhat like a suture.

RAPHIDIA, in zoology, a genus of the class insecta, order neuroptera. Mouth with a curved, toothed, horny mandible; thorax long, cylindrical; stemmata three; wings deflected; antennas filiform, as long as the thorax, the anterior part elongated and cylindrical; feelers four, very short, filiform; tail of the female terminated by a large recurved bristle. Two species only, one with immaculate wings, the other having wings with a brown marginal spot, perhaps merely a variety of the first. Both inhabit Europe, and are found in the woods of our own country: they prey on other insects.

RAPHOE, a town of Ireland, in the county of Donegal, and a bishop's see. The cathedral serves as a parish church. It is 11 miles S.W. of Londonderry, and 21 N.E. of Donegal.

RA'PID. *a.* (*rapide*, Fr.) Quick; swift (*Dryden*).

RAPI'DITY. *s.* (*rapidité*, Fr.) Celerity; velocity; swiftness (*Addison*).

RA'PIDLY. *ad.* (from *rapid.*) Swiftly; with quick motion.

RA'PIDNESS. *s.* (from *rapid.*) Celerity; swiftness.

RA'PIER. *s.* (*rapiere*, Fr.) A small sword used only in thrusting (*Pope*).

RA'PIER-FISH. *s.* The swordfish (*Grew*).

RAPIN (Renatus), a learned jesuit, born at Tours, 1621. He wrote Latin with great elegance, and his poem on gardens, in four books, has been translated into English by Evelyn, and also by Gardiner. His treatises on polite literature were translated from the French into English, by B. Kennet, 2 vols. 8vo. They contain well written comparisons between Demosthenes and Cicero on eloquence, between Homer and Virgil, and are intended to restore good taste, in France. He died at Paris 1687.

RAPIN DE THOYRAS (Paul de), a Frenchman, known as an eminent historian, born at Castres, Languedoc, 1661. He studied at Puylaurens and Saumur, and applied himself to the law, which he abandoned for the profession of arms, but on the revocation of the edict of Nantes, he left France, for England, in 1686. After a short stay in London, he went to Holland, where he enlisted in a company of French volunteers. He accompanied William III. into England, and served in the army in Ireland, at the battle of the Boyne, and the siege of Limerick, where he was wounded. In 1693, he was tutor to lord Portland's son, with a pension of 100l. from the king, and the promise of greater patronage, which he never received. In 1707 he retired to Wezel in the duchy of Cleves, devoted for 17 years to the completion of his history of England. His health suffered by his application, and the attack of a fever carried him to his grave after a week's illness, 1725. He wrote in French, 1. A Dissertation on the Whigs and Tories. 2. His History of England, printed at the Hague in 1726 and 1727, in 9 vols. 4to, and reprinted at Trevoux in 1728, in 10 vols. 4to. This last edition is more complete than that of the Hague. It has been translated into English, and improved with notes, by the Rev. Mr. Tindal, in 2 vols. folio. This performance, though the work of a foreigner, is deservedly esteemed as the fullest and most impartial collection of English political transactions extant. The readers of wit and vivacity, however, may be apt to complain of him for being sometimes rather tedious and dull.

RA'PINE. *s.* (*rapina*, Lat.) 1. The act of plundering (*King Charles*). 2. Violence; force (*Milton*).

RAPPAHANNOC, a river of Virginia, which rises in the mountains, called the Blue Ridge, and flows by Falmouth, Fredericsburg, Portroyal, Leeds, Tappahannoc, and Urbanna, into Chesapeak bay.

RAPPER, *s.* (from *rap.*) One who strikes.

RAPPERSCHWEIL, a town of Swisserland, in the canton of Zurich, seated on a neck of land that advances into the lake of Zurich, over which is a wooden bridge, 1850 feet long. It is 18 miles S.E. of Zurich, and 20 N.W. of Glaris.

RA'PPORT. *s.* (*rappat*, Fr.) Relation; reference: not used (*Temple*)

To RAPT. *v. n.* To ravish; to put in ecstacy.

RAPT. *s.* (from *rap.*) A trance; an ecstacy.

RA'PTURE. *s.* 1. Violent seizure (*Chapman*). 2. Ecstacy; transport; violence of any pleasing passion (*Addison*). 3. Rapidity; haste (*Milton*).

RA'PTURED. *a.* (from *rapture.*) Ravished; transported. A bad word (*Thomson*).

RA'PTUROUS. *a.* (from *rapture*). Ecstatic; transporting (*Collier*).

RAPUNCULUS. (*ranunculus*, dim. of *rapa*, the turnip.) The wild turnip.

RAPUNCULUS VIRGINIANUS. The name given by Morrison to the blue cardinal flower. See LOBELIA.

RAPUS. Rapa. Napus. Napus dulcis. Garden or sweet navew. French turnip. Brassica rapa of Linnéus. The seeds of this plant are sometimes used medicinally. They possess similar virtues to those of mustard. See SINAPI.

RARE. *a.* (*rarus*, Latin.) 1. Scarce; uncommon (*Shakspeare*). 2. Excellent; incomparable; valuable to a degree seldom found (*Cowley*). 3. Thinly scattered (*Milton*). 4. Thin; subtile; not dense (*Newton*). 5. Raw; not fully subdued by the fire (*Dryden*).

RA'REESHOW. *s.* (*rare* and *show.*) A show carried in a box (*Gay*).

RAREFACTION, *rarefactio*, in physics, the act whereby a body is rendered rare; that is, is brought to possess more room, or appear under a larger bulk, without accession of any new matter.

Rarefaction is opposed to condensation.

Our more accurate writers restrain rarefaction to that expansion of a mass into a larger

bulk, which is effected by means of heat. All expansion from other causes they call dilatation.

It is by rarefaction that gunpowder takes effect; and to the same principle also we owe eolipiles, thermometers, &c. The degree to which air is rarefiable exceeds all imagination; perhaps indeed its degree of expansion is absolutely beyond all limits. Upon the rarefaction of the air is founded the method of measuring altitudes by the barometer; in all cases of which the rarity of the air is found to be inversely as the force that compresses it, or inversely as the weight of all the air above it at any place.

The open air, in which we breathe, says sir Isaac Newton, is 8 or 900 times lighter than water, and by consequence 8 or 900 times rarer. And since the air is compressed by the weight of the incumbent atmosphere, and the density of the air is proportionable to the compressing force, it follows by computation, that at the height of about seven English miles from the earth, the air is four times rarer than at the surface of the earth; and at the height of 14 miles, it is 16 times rarer than at the surface of the earth; and at the height of 21, 28, or 35 miles, it is respectively 64, 256, or 1024 times rarer, or thereabouts; and at the height of 70, 140, and 210 miles, it is about 1,000,000, 1,000,000,000,000, or 1,000,000,000,000,000,000, &c.

Mr. Cotes has found, from experiments made with a thermometer, that linseed-oil is rarefied in the proportion of 40 to 39 in the heat of the human body; in that of to 15 to 14, in that degree of heat wherein water is made to boil; in the proportion of 15 to 13, in that degree of heat wherein melted tin begins to harden; and finally, in the proportion of 23 to 20, in that degree wherein melted tin arrives at a perfect solidity. The same author discovered, that the rarefaction of the air, in the same degree of heat, is ten times greater than that of the linseed-oil; and the rarefaction of the oil, about fifteen times greater than that of the spirit of wine.

RA'REFIABLE. *a.* (from *rarefy.*) Admitting rarefaction.

To RA'REFY. *v. a.* (*rarefier*, Fr.) To make thin: contrary to *condense* (*Thomson*).

To RA'REFY. *v. n.* To become thin (*Dryden*).

RA'RELY. *ad.* (from *rare.*) 1. Seldom; not often; not frequently (*Fell*). 2. Finely; nicely; accurately (*Shakspeare*).

RA'RENESS. *s.* (from *rare.*) 1. Uncommonness; state of happening seldom; infrequency (*Dryden*). 2. Value arising from scarcity (*Bacon*). 3. Thinness; tenuity.

RA'RITY. *s.* (*rarité*, Fr. *raritus*, Latin.) 1. Uncommonness; infrequency (*Spectator*). 2. Any thing valued for its scarcity (*Shakspeare*). 3. Thinness; subtilty: the contrary to *density* (*Bentley*).

RA'SCAL. *s.* (narcal, Saxon, a lean beast.) A mean fellow; a scoundrel (*Dryden*).

RASCA'LION. *s.* (from *rascal.*) One of the lowest people (*Hudibras*).

RASCA'LITY. *s.* (from *rascal.*) The low mean people (*South*).

RA'SCALLY. *a.* (from *rascal.*) Mean; worthless (*Swift*).

To RASE. *v. a.* (*raser*, Fr. *rasus*, Latin.) 1. To skim; to strike on the surface (*South*). 2. To overthrow; to destroy; to root up (*Milton*). 3. To blot out by rasure; to erase (*Milton*).

RASH. *a.* (*rasch*, Dutch.) Hasty; violent; precipitate; acting without caution (*Asch.*).

RASH. (*Exanthema.*) A family of diseases characterised by red patches on the skin, variously figured; in general confluent, and diffused irregularly over the body, leaving interstices of a natural colour. Portions of the cuticle are often elevated in a rash, but the elevations are not acuminated. The eruption is usually accompanied with a general disorder of the constitution, and terminates in a few days, by cuticular exfoliations. See MEDICINE.

RA'SHER. *s.* A thin slice of bacon (*Sh.*).

RA'SHLY. *ad.* (from *rash*). Hastily; violently; without due consideration (*Smith*).

RA'SHNESS. *s.* (from *rash.*) Foolish contempt of danger; precipitation (*Dryden*).

RASOR. See RAZOR.

RASOR-BILL. See ALCA.

RASOR-FISH. See SOLEN.

To RASP. *v. a.* (*raspen*, Dutch.) To rub to powder with a very rough file (*Moxon*).

RASP. *s.* (from the verb.) A large rough file, commonly used to wear away wood (*Moxon*).

RA'SPATORY. *s.* (*raspatoir*, French.) A chirurgeon's rasp (*Wiseman*).

RASPBERRY, in botany. See RUBUS.

RASPENBURG, a town of Upper Saxony, in Thuringia, near which are some medicinal springs, and the ruins of the once celebrated castle of Rasseburg. It is situate on the river Lossa, on the ridge of mountains called Finne, 15 miles N.N.E. of Weimar.

RASTADT, a town of Suabia, in the margravate of Baden, with a noble castle. In 1714, a treaty was concluded here between the French and Austrians; and in 1796, the former defeated the latter near this place. It is seated on the Merg, near the Rhine, five miles N.E. of Baden, and 24 S.W. of Philipsburg.

RASTAL (John), a printer born in London, was educated at Oxford. He wrote a description of Europe, Asia, and Africa, in the form of a drama, with cuts—and also canones astrologici—dialogues concerning purgatory—rules of a good life—Anglorum regum chronicum—apology against John Fyrth, &c. He died 1536. His son William was one of the justices of the king's bench under Mary, and published a chronological table from the conqueror—the chartuary 1580—terms of the English law, &c.

RA'SURE. *s.* (*rasura*, Latin.) 1. The act of scraping or shaving. 2. A mark in a writing where something has been rubbed out (*Ayliffe*).

RAT, in mastiology. See MUS.

To smell a RAT. To be put on the watch by suspicion; to suspect danger (*Hudibras*).

RA'TABLE. *a.* (from *rate.*) Set at a certain value (*Camden*).

RA'TABLY. *ad.* Proportionably (*Raleigh*).

RATAFIA, a fine spirituous liquor, prepared from the kernels, &c. of several kinds of fruits, particularly of cherries and apricots.

Ratafia of cherries is prepared by bruising the cherries, and putting them into a vessel wherein brandy has been long kept; then adding to them the kernels of cherries, with strawberries, sugar, cinnamon, white pepper, nutmegs, cloves; and to twenty pound of cherries, ten quarts of brandy. The vessel is left open ten or twelve days, and then stopped close for two months before it be tapped.

Ratafia of apricots is prepared two ways; viz. either by boiling the apricots in white wine, adding to the liquor an equal quantity of brandy, with sugar, cinnamon, mace, and the kernels of apricots; infusing the whole for eight or ten days; then straining the liquor, and putting it up for use: or else by infusing the apricots, cut in pieces, in brandy, for a day or two; passing it through a straining-bag, and then putting in the usual ingredients.

RATA'N. *s.* An Indian cane.

RATCH. *s.* In clockwork, a sort of wheel which serves to lift up the detents every hour, and thereby make the clock strike (*Bailey*).

RATE. *s.* (*ratus*, Latin.) 1. A price fixed on any thing (*Dryden*). 2. Allowance settled (*Addison*). 3. Degree; comparative height or value (*Shakspeare*). 4. Quantity assignable (*Shakspeare*). 5. That which sets value; principle on which value is set (*Atterbury*). 6. Manner of doing any thing; degree to which any thing is done (*Clarendon*). 7. Tax imposed by the parish (*Prior*).

To RATE. *v. n.* (from the noun.) 1. To value at a certain price (*Boyle*). 2. (*reita*, Islandic.) To chide hastily and vehemently (*South*).

To RATE. *v. n.* To make an estimate (*Kettlewell*).

RATE OF A SHIP OF WAR, is its order, degree, or distinction, as to magnitude, burden, &c. The rate is usually accounted by the length and breadth of the gun-deck, the number of tons, and the number of men and guns the vessel carries. Of these there are six rates. A first rate man of war has its gun-deck from 159 to 174 feet in length, and from 44 to 50 feet broad; it contains from 1313 to 1882 tons, has from 706 to 800 men, and carries from 96 to 100 or 110 guns. Second rate ships have their gun-decks from 153 to 165 feet long, and from 41 to 46 feet broad; they contain from 1086 to 1482 tons, and carry from 524 to 640 men, and from 84 to 90 guns. Third rates have their gun-decks from 140 to 158 feet in length, from 37 to 42 feet broad; they contain from 871 to 1262 tons; carry from 389 to 476 men, and from 64 to 80 guns. Fourth rates are in length on the gun-decks from 118 to 146 feet, and from 29 to 38 broad; they contain from 448 to 915 tons; carry from 226 to 346 men, and from 48 to 60 guns. Fifth rates have their gun-decks from 100 to 120 feet long, and from 24 to 31 broad; they contain from 259 to 542 tons, and carry from 145 to 190 men, and from 26 to 44 guns. Sixth rates have their gun-decks from 87 to 95 feet long, and from 22 to 25 feet broad; they contain from 152 to 256 tons, carry from 50 to 110 men, and from 16 to 24 guns.

It is to be observed, that the new-built ships are much larger, as well as better, than the old ones of the same rate; whence they double numbers all along; the larger of which express the proportions of the new-built ships, as the less those of the old ones.

Nothing more evidently manifests the great improvement of the marine art, and the degree of perfection to which it has arrived in Britain, than the facility of managing our first rates; which were formerly esteemed incapable of government, unless in the most favourable weather of the summer. Ships of the second rate, and those of the third, which have three decks, carry their sails remarkably well, and labour very little at sea. They are excellent in a general action, or in cannonading a fortress. Those of the third rate, which have two tiers, are fit for the line of battle, to lead the convoys and squadrons of ships of war in action, and in general to suit the different exigencies of the naval service. The fourth rates may be employed on the same occasions as the third rates, and may be also destined amongst the foreign colonies, or on expeditions of great distance; since these vessels are usually excellent for keeping and sustaining the sea. Vessels of the fifth rate are too weak to suffer the shock of a line of battle; but they may be destined to lead the convoys of merchant ships, to protect the commerce in the colonies, to cruize in different stations, to accompany squadrons, or be sent express with necessary intelligence and orders. The same may be observed of the sixth rates. The frigates, which mount from 28 to 38 guns upon one deck, with the quarter-deck, are extremely proper for cruizing against privateers, or for short expeditions, being light, long, and usually excellent sailers.

RATEEN, or RATTEN, in commerce, a thick woollen stuff, quilled, woven on a loom with four treddles, like serges and other stuffs that have the whale or quilling. There are some rateens dressed and prepared like cloths; others left simply in the hair, and others where the hair or knap is frized. Rateens are chiefly manufactured in France, Holland, and Italy, and are mostly used in linings. The frize is a sort of coarse rateen, and the drugget is a rateen half linen half woollen.

RATH. *s.* A hill (*Spenser*).

RATH. *a.* (nað, Saxon, quickly.) Early; coming before the time: out of use (*May*).

RA'THER. *ad.* 1. More willingly; with better liking (*Common Prayer*). 2. Preferably to the other; with better reason (*Locke*). 3. In a greater degree than otherwise (*Dryden*).

4. More properly (*Shakspeare*). 5. Especially (*Shakspeare.*) 6. *To have* RATHER. To desire in preference (*Rogers*).

RATIBOR, a town of Silesia, capital of a principality of the same name, with a castle. The cathedral and town-house are worthy of notice. It is seated on the Oder, in a country fertile in corn and fruits, 15 miles N.E. of Troppau, and 85 S.S.E. of Breslau. Lon. 18. 13 E. Lat. 50 1 N.

RATIFICATION. *s.* (from *ratify.*) The act of ratifying; confirmation.

RATIFIER. *s.* (from *ratify.*) The person or thing that ratifies (*Shakspeare*).

To RATIFY. *v. a.* (*ratum facio*, Latin.) To confirm; to settle; to establish (*Dryden*).

RATIO, according to Euclid, is the habitude or relation of two magnitudes of the same kind in respect of quantity. So the ratio of 2 to 1 is double, that of 3 to 1 triple, &c. Several mathematicians have found fault with Euclid's definition of a ratio, and others have as much defended it, especially Dr. Barrow, in his Mathematical Lectures, with great skill and learning.

Ratio is sometimes confounded with proportion, but very improperly, as being quite different things; for proportion is the similitude or equality or identity of two ratios. So the ratio of 6 to 2 is the same as that of 3 to 1, and the ratio of 15 to 5 is that of 3 to 1 also; and therefore the ratio of 6 to 2 is similar or equal or the same with that of 15 to 5, which constitutes proportion, which is thus expressed, 6 is to 2 as 15 to 5, or thus, 6 : 2 :: 15 : 5, which means the same thing. So that ratio exists between two terms, but proportion between two ratios or four terms.

The two quantities that are compared, are called the terms of the ratio, as 6 and 2; the first of these 6 being called the antecedent, and the latter 2 the consequent. Also the index or exponent of the ratio, is the quotient of the two terms: so the index of the ratio of 6 to 2 is $\frac{6}{2}$ or 3, and which is therefore called a triple ratio.

Wolfius distinguishes ratios into *rational* and *irrational.*

Rational ratio is that which can be expressed between two rational numbers; as the ratio of 6 to 2, or of $6\sqrt{3}$ to $2\sqrt{3}$, 3 to 1. And,

Irrational ratio is that which cannot be expressed by that of one rational number to another; as the ratio of $\sqrt{6}$ to $\sqrt{2}$, or of $\sqrt{3}$ to root $\sqrt{1}$, that is $\sqrt{3}$ to 1, which cannot be expressed in rational numbers.

When the two terms of a ratio are equal, the ratio is said to be that of equality; as of 3 to 3, whose index is 1, denoting the single or equal ratio. But when the terms are not equal, as of 6 to 2, it is a ratio of inequality.

Farther, when the antecedent is the greater term, as in 6 to 2, it is said to be the ratio of greater inequality: but when the antecedent is the less term, as in the ratio of 2 to 6, it is said to be the ratio of less inequality. In the former case, if the less term be an aliquot part of the greater, the ratio of greater inequality is said to be *multiplex* or *multiple*; and the ratio of the less inequality, *sub-multiple.* Particularly in the first case, if the exponent of the ratio be 2, as in 6 to 3, the ratio is called *duple* or *double*; if 3, as in 6 to 2, it is *triple*; and so on. In the second case, if the ratio be $\frac{1}{2}$, as in 3 to 6, the ratio is called *subduple*; if $\frac{1}{3}$, as in 2 to 6, it is *subtriple*; and so on.

If the greater term contain the less once, and one aliquot part of the same over, the ratio of the greater inequality is called *superparticular*, and the ratio of the less *subsuperparticular.* Particularly, in the first case, if the exponent be $\frac{3}{2}$ or $1\frac{1}{2}$, it is called *sesquialterate*; if $\frac{4}{3}$ or $1\frac{1}{3}$, *sesquitertial*; &c. In the other case, if the exponent be $\frac{2}{3}$, the ratio is called *subsesquialterate*; if $\frac{3}{4}$, it is *subsesquitertial.*

When the greater term contains the less once and several aliquot parts over, the ratio of the greater inequality is called *superpartiens*, and that of the less inequality is *subsuperpartiens.* Particularly in the former case, if the exponent be $\frac{5}{3}$ or $1\frac{2}{3}$, the ratio is called *superbipartiens tertius*; if the exponent be $\frac{7}{4}$ or $1\frac{3}{4}$, *supertripartiens quartas*; if $1\frac{1}{7}$ or $1\frac{4}{7}$ *superquadripartiens septimas*; &c. In the latter case, if the exponent be the reciprocals of the former, or $\frac{3}{5}$, the ratio is called *supsuperbipartiens tertias*; if $\frac{4}{7}$, *subsupertripartiens quartas*; if $\frac{7}{11}$ *subsuperquadripartiens septimas*; &c.

When the greater term contains the less several times, and some one part over, the ratio of the greater inequality is called *multiplex superparticular*; and the ratio of the less inequality is called *submultiplex subsuperparticular.* Particularly in the former case, if the exponent be $\frac{5}{2}$ or $2\frac{1}{2}$, the ratio is called *dupla sesquialtera*; if $\frac{13}{4}$ or $3\frac{1}{4}$, *tripla sesquiquarta*, &c. In the latter case, if the exponent be $\frac{2}{5}$, the ratio is called *subdupla subsesquialtera*; if $\frac{4}{13}$, *subtripla subsesquiquarta*, &c. Lastly, when the greater term contains the less several times, and several aliquot parts over; the ratio of the greater inequality is called *multiplex superpartiens*; that of the less inequality, *submultiplex subsuperpartiens.* Particularly in the former case, if the exponent be $\frac{8}{3}$ or $2\frac{2}{3}$, the ratio is called *dupla superbipartiens tertias*; if $\frac{25}{7}$ or $3\frac{4}{7}$, *tripla superbiquadripartiens septimas*; &c. In the latter case, if the exponent be $\frac{3}{8}$, the ratio is called *subdupla subsuperbipartiens tertias*; if $\frac{7}{25}$, *subtripla subsuperquadripartiens septimas*; &c.

These are the various denominations of rational ratios, names which are very necessary to the reading of the ancient authors; though they occur but rarely among the modern writers, who use instead of them the smallest numeral terms of the ratios; such 2 to 1 for duple, and 3 to 2 for sesquialterate, &c.

Compound ratio, is that which is made up of two or more other ratios, viz. by multiplying the exponents together, and so producing the compound ratio of the product of all the antecedents to the product of all the consequents.

Thus the compound ratio of 5 to 3,
and 7 to 4,
is the ratio of.....35 to 12.

Particularly if a ratio be compounded of two equal ratios, it is called the duplicate ratio; if of three equal ratios, the triplicate ratio; if of four equal ratios, the quadruplicate ratio; and so on, according to the powers of the exponents, for all multiplicate ratios. So the several multiplicate ratios of

the simple ratio of - 3 to 2, are thus, viz.
the duplicate ratio - 9 : 4,
the triplicate ratio - 27 : 8,
the quadruplicate ratio 81 : 16, &c.

Properties of ratios. Some of the more remarkable properties of ratios are as follow:

1. The like multiples, or the like parts, of the terms of a ratio, have the same ratio as the terms themselves. So a ; b, and na : nb, and $\frac{a}{n} : \frac{b}{n}$ are all the same ratio.

2. If to, or from, the terms of any ratio, be added or subtracted either their like parts, or their like multiples, the sums or remainders will still have the same ratio. So $a : b$, and $a \pm na : b \pm nb$, and $a \pm \frac{a}{n} : b \pm \frac{b}{n}$ are all the same ratio.

3. When there are several quantities in the same continued ratio, a, b, c, d, e, &c. whatever ratio the first has to the 2d,
the 1st to the 3d has the duplicate of that ratio,
the 1st to the 4th has the triplicate of that ratio,
the 1st to the 5th has the quadruplicate of it, and so on. Thus, the terms of the continued ratio being $1, r, r^2, r^3, r^4, r^5$, &c. where each term has to the following one the ratio of 1 to r, the ratio of the 1st to the 2d; then $1 : r^2$ is the duplicate, $1 : r^3$ the triplicate, $1 : r^4$ the quadruplicate, and so on, according to the powers of $1 : r$.

For other properties, see PROPORTION.

To approximate to a ratio in smaller terms. See Hutton's Dictionary, article RATIO.

The doctrine of ratios and proportions, as delivered by Euclid, in the fifth book of his Elements, is considered by most persons as very obscure and objectionable, particularly the definition of proportionality; and several ingenious gentlemen have endeavoured to elucidate that subject. Among these, the Rev. Dr. Abram Robertson, of Christ-church college, Oxford, Savilian professor of astronomy in that university, printed a neat little paper there in 1789, being a demonstration of that definition, in seven propositions, the substance of which is as follows. He first premises this advertisement:

"As demonstrations depending upon proportionality pervade every branch of mathematical science, it is a matter of the highest importance to establish it upon clear and indisputable principles. Most mathematicians, both ancient and modern, have been of opinion that Euclid has fallen short of his usual perspicuity in this particular. Some have questioned the truth of the definition upon which he has founded it, and almost all who have admitted its truth and validity have objected to it as a definition. The author of the following propositions ranks himself amongst objectors of the last-mentioned description. He thinks that Euclid must have founded the definition in question upon the reasoning contained in the first six demonstrations here given, or upon a similar train of thinking; and in his opinion a definition ought to be as simple, or as free from a multiplicity of conditions, as the subject will admit."

He then lays down these four definitions:

"1. Ratio is the relation which one magnitude has to another, of the same kind, with respect to quantity.

"2. If the first of four magnitudes be exactly as great when compared to the second, as the third is when compared to the fourth, the first is said to have to the second the same ratio that the third has to the fourth.

"3. If the first of four magnitudes be greater, when compared to the second, than the third is when compared to the fourth, the first is said to have to the second a greater ratio than the third has to the fourth.

"4. If the first of four magnitudes be less, when compared to the second, than the third is when compared to the fourth, the first is said to have to the second a less ratio than the third has to the fourth."

Dr. Robertson then delivers the propositions, which are the following:

"*Prop.* 1. If the first of four magnitudes have to the second, the same ratio which the third has to the fourth; then if the first be equal to the second, the third is equal to the fourth; if greater, greater; if less, less.

"*Prop.* 2. If the first of four magnitudes be to the second as the third to the fourth, and if any equimultiples whatever of the first and third be taken, and also any equimultiples of the second and fourth; the multiple of the first will be to the multiple of the second as the multiple of the third to the multiple of the fourth.

"*Prop.* 3. If the first of four magnitudes be to the second as the third to the fourth, and if any like aliquot parts whatever be taken of the first and third, and any like aliquot parts whatever of the second and fourth, the part of the first will be to the part of the second as the part of the third to the part of the fourth.

"*Prop.* 4. If the first of four magnitudes be to the second as the third to the fourth, and if any equimultiples whatever be taken of the first and third, and any whatever of the second and fourth; if the multiple of the first be equal to the multiple of the second, the multiple of the third will be equal to the multiple of the fourth; if greater, greater; if less, less.

"*Prop.* 5. If the first of four magnitudes be to the second as the third is to a magnitude less than the fourth, then it is possible to take certain equimultiples of the first and third, and certain equimultiples of the second and fourth,

such, that the multiple of the first shall be greater than the multiple of the second, but the multiple of the third not greater than the multiple of the fourth.

"*Prop.* 6. If the first of four magnitudes be to the second as the third is to a magnitude greater than the fourth, then certain equimultiples can be taken of the first and third, and certain equimultiples of the second and fourth, such, that the multiple of the first shall be less than the multiple of the second, but the multiple of the third not less than the multiple of the fourth.

"*Prop.* 7. If any equimultiples whatever be taken of the first and third of four magnitudes, and any equimultiples whatever of the second and fourth; and if when the multiple of the first is less than that of the second, the multiple of the third is also less than that of the fourth; or if when the multiple of the first is equal to that of the second, the multiple of the third is also equal to that of the fourth; or if when the multiple of the first is greater than that of the second, the multiple of the third is also greater than that of the fourth: then, the first of the four magnitudes shall be to the second as the third to the fourth."

To RATIO'CINATE. *v. n.* (*ratiocinor*, Lat.) To reason; to argue.

RATIOCINA'TION. *s.* (*ratiocinatio*, Lat.) The act of reasoning; the act of deducing consequences from premises (*Brown*).

RATIOCINA'TIVE. *a.* (from *ratiocinate*,) Argumentative; advancing by process of discourse (*Hale*).

RA'TIONAL. *a.* (*rationalis*, Latin.) 1. Having the power of reasoning (*Law*). 2. Agreeable to reason (*Glanville*). 3. Wise; judicious: as, *a* rational *man*.

RATIONAL, in arithmetic, &c. the quality of numbers, fractions, quantities, &c. when they can be expressed by common numbers; in contradistinction to irrational or surd ones, which cannot be expressed in common numbers.

RATIONA'LE. *s.* (from *ratio*, Latin.) A detail with reasons (*Sparrow*).

RA'TIONALIST. *s.* (from *rational*.) One who proceeds in his disquisitions and practice wholly upon reason (*Bacon*).

RATIONA'LITY. *s.* (from *rational*.) 1. The power of reasoning (*Gov. of the Tongue*). 2. Reasonableness (*Brown*).

RA'TIONALLY. *ad.* (from *rational*.) Reasonably; with reason (*South*).

RA'TIONALNESS. *s.* (from *rational*.) The state of being rational.

RATISBON, or REGENSBURG, a strong city of Bavaria, lately imperial, and an episcopal see, but now the capital of the principality of Ratisbon, and the see of an archbishop, transferred from Mentz to this place in 1798. The abbey of St. Emmeran contains the relics of St. Denys, a valuable library, and a fine collection of mathematical instruments. The townhouse is magnificent, and in its hall the general diets of the empire used to meet. The inhabitants, in general, are protestants, and about 24,000. Ratisbon has a great trade in salt, for which it is a depot, and sends large quantities of corn and wood to Vienna. It has an ancient bridge, of 15 arches, over the Danube, and stands on the S. side of that river, at the influx of the Regem, 62 miles N. by E. of Munich, and 195 W. by N. of Vienna. Lon. 12, 6 E. Lat. 48. 58 N.

RATLINES, or, as the sailors call them, ratlins, those lines which make the ladder steps to go up the shrouds and puttocks, hence called the ratlins of the shrouds.

RATOATH, a borough of Ireland, in the county of Meath, 12 miles E. of Trim, and 12 N.W. of Dublin.

RATOLFZEL, a strong town of Suabia, on that part of the lake of Constance called Boden see. It belongs to the house of Austria, and is 12 miles W. of the city of Constance.

RATSBANE. See ARSENIC.

RAT-TAILS, excrescences which creep from the pastern to the middle of the shank of a horse; so called from their resemblance to a rat's tail. Some are moist; others dry: the former may be treated as in the cure of the grease; and the latter with mercurial ointment.

RATTLE (Red), in botany. See PEDICULARIS.

RATTLE (Yellow), in botany. See RHINANTHUS.

To RA'TTLE. *v. n.* (*ratelen*, Dutch.) 1. To make a quick sharp noise with frequent repetitions and collisions of bodies not very sonorous (*Hayward*). 2. To speak eagerly and noisily (*Swift*).

To RA'TTLE. *v. a.* 1. To move any thing so as to make a rattle or noise (*Dryden*). 2. To stun with a noise; to drive with a noise (*Shakspeare*). 3. To scold; to rail at with clamour (*Arbuthnot*).

RA'TTLE. *s.* (from the verb.) 1. A quick noise nimbly repeated (*Prior*). 2. Empty and loud talk (*Hakewill*). 3. An instrument, which agitated makes a clattering noise (*Raleigh*).

RA'TTLEHEADED. *a.* (*rattle* and *head*.) Giddy; not steady.

RATTLESNAKE. See CROTALUS.

RATTLESNAKE-ROOT. See SENECA and POLYGALA.

RATTLING, among farriers, a term used of a horse when a noise is produced by the air entering between the prepuce and the penis, in trotting.

RATZEBURG, a fortified town of Lower Saxony, capital of a principality of the same name, subject to the duke of Mecklinburg-Strelitz. The town is seated on an island, in the midst of a lake, 30 miles in circumference. The buildings are of brick, and almost every house is shaded with a tree. From the lake of Ratzeburg issues the river Waknitz, which joins the Trave near Lubec. Ratzeburg is noted for its excellent beer, and is 14 miles S. by E. of Lubec, and 22 S. of Lauenburg. Lon. 10. 52 E. Lat. 53. 43 N.

To RA'VAGE. *v. a.* (*ravager*, Fr.) To lay

waste; to sack; to ransack; to spoil; to pillage; to plunder (*Addison*).

RA'VAGE. *s.* (*ravage*, French.) Spoil; ruin; waste (*Dryden*).

RA'VAGER. *s.* (from *ravage*.) Plunderer; spoiler (*Swift*).

RAUCEDO. (from *raucus*, hoarse.) Raucitas. Hoarseness. It is always symptomatic of some other disease.

RAUCITAS. (from *raucus*, hoarse.) In medicine. Hoarseness.

To RAVE. *v. n.* (*reven*, Dutch; *rêver*, Fr.) 1. To be delirious; to talk irrationally (*Smith*). 2. To burst out into furious exclamations as if mad (*Sandys*). 3. To be unreasonably fond (*Locke*).

To RA'VEL. *v. a.* (*ravelin*, Dutch.) 1. To entangle; to entwist one with another; to make intricate; to involve (*Waller*). 2. To unweave; to unknit (*Shakspeare*). 3. To hurry over in confusion (*Digby*).

To RA'VEL. *v. n.* 1. To fall into perplexity or confusion (*Milton*). 2. To work in perplexity; to busy himself with intricacies (*Decay of Piety*).

RAVELIN, in fortification, was anciently a flat bastion, placed in the middle of a curtin; but now a detached work composed only of two faces, which make a saliant angle, without any flanks, and raised before the curtin on the counterscarp of the place. A ravelin is a triangular work, resembling the point of a bastion with the flanks cut off. See FORTIFICATION.

Its use before a curtin is, to cover the opposite flanks of the two next bastions. It is used also to cover a bridge or a gate, and is always placed without the moat. There are also double ravelins that serve to cover each other; they are said to be double when they are joined by a curtin.

RA'VEN, in ornithology. See CORNUS.

To RA'VEN. *v. a.* (ræfian, Sax. to rob.) To devour with great eagerness and rapacity.

To RA'VEN. *v. n.* To prey with rapacity (*Luke*).

RAVENGLASS, a seaport in Cumberland, with a market on Saturday. It stands on an inlet of the Irish sea, between the Mite and Esk, which, with the Irt, run into this inlet, and form a good harbour; but the adjacent country furnishing little for exportation, its chief trade is in oysters. Two miles from the town, on the S. side of the Esk, are ruins of three miles in circumference, called the city of Barnscar, of which no historical documents appear to exist. Ravenglass is 16 miles S.S.E. of Whitehaven, and 279 N.N.W. of London. Lon. 3. 30 W. Lat. 54. 22 N.

RAVENNA, a city of Italy, on the Adriatic, celebrated under the Roman emperors for its capacious harbour, which could contain 250 ships, and for being for some time the seat of the western empire. It was founded by a colony of Thessalians, or, according to others, of Sabines. It is now an archbishop's see, with several colleges, a great number of religious houses, and a ruinous citadel. It had a very flourishing trade, but has greatly suffered since the sea has withdrawn two miles from it. It is now chiefly noted for the excellent wine produced in its neighbourhood. Theodoric king of the Goths resided here, and afterward the exarchs of the Greek emperors. In the sixth century, when there were three popes at the same time, one lived at Ravenna. The mausoleum of Theodoric is still to be seen, and is remarkable for being covered by a single stone, 28 feet in diameter, and 15 thick. Ravenna is seated near the river Mantone, 37 miles S.E. of Ferrara, and 162 N. of Rome. Lon. 12. 5 E. Lat. 44. 25 N.

RA'VENOUS. *a.* (from *raven*.) Furiously voracious; hungry to rage (*Shakspeare*).

RA'VENOUSLY. *ad.* With raging voracity.

RA'VENOUSNESS. *s.* (from *ravenous*.) Rage for prey; furious voracity (*Hale*).

RAVENSBERG, a county of Westphalia, lying S. of the bishoprics of Minden and Osnaburgh. It is so called from a castle of the same name, and is subject to the king of Prussia. Hereford is the capital.

RAVENSBURG, a free imperial town of Suabia. The public structures are handsome, and the inhabitants are partly protestants, and partly papists. It is seated on the Cheuss, 15 miles N. by W. of Lindau. Lon. 9. 40 E. Lat. 47. 59 N.

RAVENSTEIN, a town of Dutch Brabant, capital of a county of the same name, with an ancient and strong castle. It belongs to the elector palatinate, but has a Dutch garrison. It is seated on the Maese, 10 miles S.W. of Nimeguen. Lon. 5. 35 E. Lat. 51. 46. N.

RAVET. See SCARABÆUS.

RAUGHT. The old pret. and part. pass. of *reach*.

RAVILLIAC (Francis), a native of Angoulême, where he practised as an attorney, and afterwards kept a school. The leaguers inspired him with an aversion to Henry IV. and he believed it lawful to kill all those who put the catholic religion in danger, or made war against the pope. He assassinated the king in his coach the 14th of May, 1610, and was drawn in quarters at the Place de Grêve, the 27th of the same month.

RA'VIN. *s.* (from *raven*.) 1. Prey; food gotten by violence (*Milton*.) 2. Rapine; rapaciousness (*Ray*).

RAVINE. (*ravine*, Fr.) A hollow or channel scooped out by a torrent or flood.

RA'VINGLY. *ad.* (from *rave*.) With frenzy; with distraction (*Sidney*).

To RA'VISH. *v. a.* (*ravir*, Fr.) 1. To deflour by force (*Shakspeare*). 2. To take away by violence (*Shakspeare*). 3. To delight to rapture; to transport (*Cant.*).

RA'VISHER. *s.* (*ravisseur*, French.) 1. He that embraces a woman by violence (*Taylor*). 2. One who takes any thing by violence.

RA'VISHMENT. *s.* (*ravissement*, French.) 1. Violation; forcible constupration (*Taylor*). 2. Transport; rapture; ecstacy; pleasing violence on the mind (*Milton*).

RAVITZ, a town of Poland, in the palatinate of Posnania, with a considerable manufacture of cloth, 24 miles S. of Posen.

RAUSCHENBERG, a town of Germany, in the principality of Hesse, four miles N. of Marpurg, and 32 S.S.W. of Cassel. Lon. 8. 46 E. Lat. 50. 33 N.

RAUWOLF (Leonard), a physician and botanist of Augsburg, who, to accomplish himself in this latter science, travelled through Syria, Arabia, and America. He published an account of his travels, which was translated and printed in England in 1693. Being persecuted for his religious opinions, he retired to Linton, where he died in 1606. His Flora Orientalis was printed at Leyden in 1755.

RAUWOLFIA, in botany, a genus of the class pentandria, order monogynia. Corol twisted; berry succulent, two-seeded. Four species, trees or shrubs of South America. The two following are cultivated.

1. R. nitida. Shining Rauwolfia. A small tree, glabrous all over, upright, full of a white glutinous milk; leaves in fours, lanceolate, pointed, glabrous, shining; flowers terminal, small, scentless, of a white hue; fruit fleshy, milky. Flowers from June to September.

2. R. carescens. Hoary Rauwolfia. An upright shrub eight feet high, the whole of it milky; leaves in fours, oblong-ovate, pointed, pubescent; flowers terminal, axillary, reddish, scentless. A native of the Caribbees.

These may be increased by seeds or berries, which should be sown in pots filled with light mould in the autumn or spring, plunging them in a mild hot-bed. They may likewise be raised by layers or cuttings.

RAW. *a.* (hneap, Saxon; *rouw*, Dutch.) 1. Not subdued by the fire (*Spenser*). 2. Not covered with the skin (*Shakspeare*). 3. Sore (*Spenser*). 4. Immature; unripe; not concocted. 5. Unseasoned; unripe in skill (*Raleigh*). 6. New (*Shakspeare*). 7. Bleak; chill (*Spenser*). 8. Not decocted (*Bacon*).

RA'WBONED. *a.* (*raw* and *bone*.) Having bones scarcely covered with flesh (*L'Estrange*).

RA'WHEAD. *s.* (*raw* and *head*.) The name of a spectre (*Dryden*).

RAWLEGH. See RALEIGH.

R'AWLY. *ad.* (from *raw*.) 1. In a raw manner. 2. Unskilfully; without experience. 3. Newly (*Shakspeare*).

RA'WNESS. *s.* (from *raw*.) 1. State of being raw (*Bacon*). 2. Unskilfulness (*Hakewill*). 3. Hasty manner (*Shakspeare*).

RAY (John), a celebrated botanist, was the son of Mr. Roger Ray, a blacksmith, and was born at Black Notly in Essex in 1628. He received the first rudiments of learning at the grammar-school at Braintree; and in 1644 was admitted into Catharine-hall in Cambridge, from whence he afterwards removed to Trinity-college in that university. He took the degree of master of arts, and became at length a senior fellow of the college. In 1651 he was Greek lecturer of his college; two years after mathematical reader, and in 1665 humanity reader. He devoted himself particularly to botany and the universal history of nature, and in 1660 published a catalogue of the Cambridge plants. To enlarge his knowledge of plants he travelled over England, Wales, and Scotland, accompanied by his pupil Mr. Willoughby, and sir Philip Skipton, and Mr. P. Courthope. At the restoration he took orders, but two years after he resigned, as he refused to subscribe. In 1663, he spent three years on the continent, with his pupil, of which he published on account in 1673. In 1672 he lost his friend Willoughby, and the following year he married the daughter of Mr. Oakley of Launton, Oxon, though nearly 24 years younger than himself. After superintending for some time the education of his friend Mr. Willoughby's children at Middleton hall, he removed to Sutton Colfield, and then to Falborne hall, Essex, and in 1679 settled in his native place, where he died 1705. As a botanist, Ray has acquired great celebrity, and his writings are held in high estimation. To strong benevolence of heart he added great humility of mind and modesty of manners. The best of his works are the wisdom of God manifested in the works of the creation, 8vo.—three discourses on the primitive chaos, the creation, deluge, and conflagration of the world, 8vo.—synopsis methodica animalium, quadrupedum, avium, et pisciun—Rauwolf's travels into the East translated, 8vo.—persuasive to a holy life, 8vo.—collection of English proverbs, often reprinted, 8vo.—catalogue of English plants—nomenclator classicus—observations, topographical, moral, &c. in foreign countries—discourse on seeds, and the differences of plants—methodus plantarum nova—historia plantarum generalis—fasciculus stirpium Britanicarum—synopsis methodica, &c. He also assisted Mr. Willoughby in his history of birds, fishes, &c.

RAY (Benjamin), was born at Spalding, Lincolnshire, and educated there and at St. John's college, Cambridge. When in orders he became curate of Surfleet, and of Cowbitt, and wrote an account of a water spout, observed in Deeping-fen, &c. and died at Spalding, 1760.

RAY, in geometry, the same as RADIUS.

RAY, in optics, a beam or line of light, propagated from a radiant point, through any medium.

If the parts of a ray of light lie all in a straight line between the radiant point and the eye, the ray is said to be direct: the laws and properties of which make the subject of optics.—If any of them be turned out of that direction, or bent in their passage, the ray is said to be refracted.—If it strike on the surface of any body, and be thrown off again, it is said to be reflected.—In each case, the ray, as it falls either directly on the eye, or on the point of reflection, or of refraction, is said to be incident.

Again, if several rays be propagated from the radiant object equidistantly from one another, they are called parallel rays. If they come inclining towards each other, they are called con-

verging rays. And if they go continually receding from each other, they are called diverging rays.

It is from the different circumstances of rays, that the several kinds of bodies are distinguished in optics. A body, for example, that diffuses its own light, or emits rays of its own, is called a radiating or lucid or luminous body. If it only reflect rays which it receives from another, it is called an illuminated body. If it only transmit rays, it is called a transparent or translucent body. If it intercept the rays, or refuse them passage, it is called an opaque body.

It is by means of rays reflected from the several points of illuminated objects to the eye, that they become visible, and that vision is performed; whence such rays are called visual rays.

The rays of light are not homogeneous, or similar, but differ in all the properties we know of; viz. refrangibility, reflexibility, and colour. It is probably from the different refrangibility that the other differences have their rise; at least it appears that those rays which agree or differ in this, do so in all the rest. It is not however to be understood that the property or effect called colour, exists in the rays of light themselves; but from the different sensations the differently disposed rays excite in us, we call them red rays, yellow rays, &c. Each beam of light however, as it comes from the sun, seems to be compounded of all the sorts of rays mixed together; and it is only by splitting or separating the parts of it, that these different sorts become observable; and this is done by transmitting the beam through a glass prism, which refracting it in the passage, and the parts that excite the different colours having different degrees of refrangibility, they are thus separated from one another, and exhibited each apart, and appearing of the different colours.

Beside refrangibility, and the other properties of the rays of light already ascertained by observation and experiment, sir I. Newton suspects they may have many more; particularly a power of being inflected or bent by the action of distant bodies; and those rays which differ in refrangibility, he conceives likewise to differ in flexibility.

These rays he suspects may be very small bodies emitted from shining substances. Such bodies may have all the conditions of light: and there is that action and reaction between transparent bodies and light, which very much resembles the attractive force between other bodies. Nothing more is required for the production of all the various colours, and all the degrees of refrangibility, but that the rays of light be bodies of different sizes; the least of which may make violet the weakest and darkest of the colours, and be the most easily diverted by refracting surfaces from its rectilinear course; and the rest, as they are larger and larger, may make the stronger and more lucid colours, blue, green, yellow, and red. See COLOUR, LIGHT, REFRACTION, REFLECTION, INFLECTION, CONVERGING, DIVERGING, &c. &c.

Among other qualities of rays it has been found by experiment that there is a very great difference in the heating power of different rays from the sun.

It appears from the experiments of Dr. Herschel, that this heating power increases from the middle of the spectrum to the red ray, and is greatest beyond it, where the rays are invisible. Hence it is inferred that the rays of light and caloric nearly accompany each other, and that the latter are in different proportions in the different coloured rays. They are easily separated from each other, as when the sun's rays are transmitted through a transparent body, the rays of light pass on seemingly undiminished, but the rays of caloric are intercepted. When the sun's rays are directed to an opaque body, the rays of light are reflected, and the rays of caloric are absorbed and retained. This is the case with the light of the moon, which, however much it be concentrated, gives no indication of being accompanied with heat. It has also been shown that the different rays of light produce different chemical effects on the metallic salts and oxyds. These effects increase on the opposite direction of the spectrum, from the heating power of the rays. From the middle of the spectrum, towards the violet end, they become more powerful, and produce the greatest effect beyond the visible rays. From these discoveries it appears that the solar rays are of three kinds: 1. Rays which produce heat: 2. Rays which produce colour; and, 3. Rays which deprive metallic substances of their oxygen. The first set of rays is in greatest abundance, or are most powerful towards the red end of the spectrum, and are least refracted. The second set, or those which illuminate objects, are most powerful in the middle of the spectrum. And the third set produce the greatest effect towards the violet end, where the rays are most refracted. The solar rays pass through transparent bodies without increasing their temperature. The atmosphere, for instance, receives no increase of temperature by transmitting the sun's rays, till these rays are reflected from other bodies, or are communicated to it by bodies which have absorbed them. This is also proved by the sun's rays being transmitted through convex lenses, producing a high degree of temperature when they are concentrated, but giving no increase of temperature to the glass itself. By this method the heat which proceeds from the sun can be greatly increased. Indeed, the intensity of temperature produced in this way is equal to that of the hottest furnace. This is done, either by reflecting the sun's rays from a concave polished mirror, or by concentrating or collecting them by the refractive power of convex lenses, and directing the rays thus concentrated on the combustible body.

RAYS (Reflected), those rays of light which are reflected, or thrown back again, from the surfaces of bodies upon which they strike. It is found that, in all the rays of light, the

angle of reflection is equal to the angle of incidence.

Rays (Refracted), are those rays of light, which are bent or broken, in passing out of one medium into another.

Rays (Pencil of), a number of rays issued from a point of an object, and diverging in the form of a cone.

Ray (Principal), in perspective, is the perpendicular distance between the eye and the vertical plane or table, as some call it.

Ray of curvature. See Radius of curvature.

Ray, in ichthyology. See Raia.

Ray. Radius. In botany, the outer part or circumference of a compound radiate flower; or radiated discous flower, as it is called by others.

To Ray. *v. a.* (*rayer*, Fr.) To streak; to mark in long lines (*Shakspeare*).

Ray, for *array* (*Spenser*).

RAYNAL (William Francis), a French historian, born at St. Genies, in Rouergue, 1718. He entered among the jesuits, but his love of liberty was too great for the confinement of a cloister, and he left the society in 1748, and settled at Paris. He wrote literary anecdotes, 3 vols. and memoirs of Ninon de l'Enclos, and was engaged in the Mercure de France; but as he had greater partiality for commercial occupations, he devoted himself more closely to the subject, and in 1770, published his history philosophical and political of the establishment, and of the commerce of the Europeans in the East and West Indies. This work was received with general approbation; but while the style and the language were admired, his calculations were discovered to be erroneous. To correct, therefore, a composition which embraced so many concerns, he travelled over France, Holland, and England, in pursuit of information. His reputation was such, that in England, the speaker of the commons observing him among the spectators, suspended the business of the house, till he had seen the historian placed in a more commodious seat. On his return he published a new edition of his work at Geneva, in 10 vols. 8vo. but his severe language against governments drew upon him the censure of the parliament of Paris, and not only his history was burnt, but his person was ordered to be seized. He was, however, allowed sufficient time to escape, and he went into Germany, and received protection from the king of Prussia, and from the empress of Russia, though he had spoken of them with sarcastic indifference. In 1788 he returned to Paris, and viewing the progress of the constituent assembly, in the destruction of whatever was venerable in France, he, in 1791, boldly addressed a letter to that body, and in firm language censured their proceedings. This appeal to the sense of the legislators was ridiculed; but it proved too prophetic of the calamities which followed. Displeased with the capital, the philosopher retired to Passy, where he expired, 1796, aged 84. Though the favourite of great men, he died in poverty, and the only property he left was an assignat of 50 livres, worth not three pence in ready money. He is to be censured for his opinions, often licentious and sceptical, yet his writings possess vigour, clearness, and elegance, and exhibit the nervous powers of an ardent imagination, and the striking features of a rapid invention. He published besides, an history of the Stadtholderate, 2 vols.—history of the English parliament, 2 vols. 12mo.—historical anecdotes from the age of Charles V. 3 vols. 12mo.—history of the divorce of Henry VIII.—historical memoirs of Europe—history of the revolutions of the English American colonies, 2 vols. It is said, that he had written an history of the revocation of the edict of Nantes, which he partly destroyed during the reign of Robespierre

RAZE. *s.* (*rayz*, a root, Spanish.) A root of ginger (*Shakspeare*).

To Raze. *v. a.* (*raser*, Fr. *rasus*, Lat.) 1. To overthrow; to ruin; to subvert (*Shakspeare*). 2. To efface (*Milton*). 3. To extirpate (*Shakspeare*).

RA'ZOR. *s.* (*rasor*, Latin.) A knife with a thick blade and fine edge used in shaving (*Dryden*).

RA'ZORABLE. *a.* (from *razor*.) Fit to be shaved: not in use (*Shakspeare*).

RAZOR-SHEATH, in helminthology. See Solem.

RA'ZURE. *s.* (*rasure*, Fr.) Act of erasing (*Shakspeare*).

RE. An inseparable particle used by the Latins, and borrowed by us to denote iteration or backward action: as, *return*, to come back; *repercussion*, the act of driving back.

Re, in music, the syllable applied by Guido to the second note of his hexachords. In the natural hexachord it is expressed by the letter D.

REA'CCESS. *s.* (*re* and *access*.) Visit renewed (*Hakewill*).

To REACH. *v a.* (pæcan, Saxon.) 1. To touch with the hand extended (*Congreve*). 2. To arrive at; to attain any thing distant; to strike from a distance (*Milton*). 3. To fetch from some place distant, and give (*Esdras*). 4. To bring forward from a distant place (*Job*). 5. To hold out; to stretch forth (*Hooker*). 6. To attain; to gain; to obtain (*Cheyne*). 7. To transfer (*Rowe*). 8. To penetrate to (*Locke*). 9. To be adequate to (*Locke*). 10. To extend to (*Addison*). 11. To extend; to spread abroad (*Milton*). 12. To take in the hand (*Milton*).

To Reach. *v. n.* 1. To be extended (*Boyle*). 2. To be extended far (*Shakspeare*). 3. To penetrate (*Addison*). 4. To make efforts to attain (*Locke*).

Reach. *s.* (from the verb.) 1. Act of touching or seizing by extension of the hand. 2. Power of reaching or taking in the hand (*Locke*). 3. Power of attainment or management (*Locke*). 4. Power; limit of faculties (*Addison*). 5. Contrivance; artful scheme; deep thought (*Hayward*). 6. A fetch; an artifice to attain some distant advantage (*Bacon*).

7. Tendency to distant consequences (*Shakspeare*). 8. Extent (*Milton*).

To REA'CT. *v. a.* (*re* and *act.*) To return the impulse or impression (*Arbuthnot*).

REA'CTION. *s.* (*reaction*, Fr.) The reciprocation of any impulse or force impressed, made by the body on which such impression is made: *action* and *reaction* are equal. See AXIOMS.

READ. *s.* (næd, Saxon.) Obsolete. 1. Counsel (*Sternhold*). 2. Saying; saw (*Spenser*).

To READ. *v. a.* pret. *read*, part. pass. *read.* (næd, Saxon.) 1. To peruse any thing written (*Pope*). 2. To discover by characters or marks (*Spenser*). 3. To learn by observation (*Shakspeare*). 4. To know fully (*Shakspeare*).

To READ. *v. n.* 1. To perform the act of perusing writing (*Deuteronomy*). 2. To be studious in books (*Taylor*). 3. To know by reading (*Swift*).

READ. *particip. a.* (from *read*; the verb *read* is pronounced *reed*; the preterit and participle *red.*) Skilful by reading (*Dryden*).

READ (Alexander), an eminent Scotch physician, celebrated for his anatomical works. He was created a doctor of physic at Oxford by royal mandate in 1602, and he was also a fellow of the college of physicians.

READE'PTION. *s.* (*re* and *adeptus*, Lat.) Recovery; act of regaining (*Bacon*).

REA'DER. *s.* (from *read.*) 1. One that peruses any thing written (*Ben Jonson*). 2. One studious in books (*Dryden*). 3. One whose office is to read prayers in churches (*Swift*).

REA'DERSHIP. *s.* (from *reader.*) The office of reading prayers (*Swift*).

REA'DILY. *ad.* (from *ready.*) Expeditely; with little hinderance or delay (*South*).

REA'DINESS. *s.* (from *ready.*) 1. Expeditiveness; promptitude (*South*). 2. The state of being ready or fit for any thing (*Clarendon*). 3. Facility; freedom from hinderance or obstruction (*Holder*). 4. State of being willing or prepared (*Addison*).

REA'DING. *s.* (from *read.*) 1. Study in books; perusal of books (*Watts*). 2. A lecture; a prelection. 3. Public recital (*Hooker*). 4. Variation of copies (*Arbuthnot*).

READING, the art of delivering written language with propriety, force, and elegance.

"We must not judge so unfavourably of eloquence or good reading (says the illustrious Fenelon), as to reckon it only a frivolous art, that a declaimer uses to impose upon the weak imagination of the multitude, and to serve his own ends. It is a very serious art, designed to instruct people; to suppress their passions, and reform their manners; to support the laws, direct public councils, and to make men good and happy."

Reason and experience demonstrate, that delivery in reading ought to be less animated than in interested speaking. In every exercise of the faculty of speech, and those expressions of countenance and gesture, with which it is generally attended, we may be considered to be always in one of the two following situations: First, delivering our bosom sentiments on circumstances which relate to ourselves or others, or, secondly, repeating something that was spoken on a certain occasion for the amusement or information of an auditor. Now, if we observe the deliveries natural to these two situations, we shall find that the first may be accompanied with every degree of expression which can manifest itself in us, from the lowest of sympathy to the most violent and energetic of the superior passions; while the latter, from the speaker's chief business being to repeat what he heard with accuracy, discovers only a faint imitation of those signs of the emotions which we suppose agitated him from whom the words were first borrowed.—The use and necessity of this difference of manner is evident; and if we are attentive to these natural signs of expression, we shall find them conforming with the greatest nicety to the slightest and most minute movements of the breast.

This repetition of another's words might be supposed to pass through the mouth of a second or third person; and in these cases, since they were not ear and eye witness of him who first spoke them, their manner of delivery would want the advantage necessarily arising from an immediate idea of the original one; hence, on this account, this would be a still less lively representation than that of the first repeater. But as, from a daily observation of every variety of speech and its associated signs of emotion, mankind soon become pretty well acquainted with them, and this in different degrees, according to their discernment, sensibility, &c. experience shows us that these latter repeaters (as we call them) might conceive and use a manner of delivery which, though less characteristic perhaps, would on the whole be no way inferior to the first, as to the common natural expression proper for their situation. It appears, therefore, that repeaters of every degree may be esteemed upon a level as to animation, and that our twofold distinction above contains accurately enough the whole variety of ordinary delivery;—we say ordinary, because

There is another very peculiar kind of delivery sometimes used in the person of a repeater, of which it will in this place be necessary to take some notice. What we mean here is mimicry; an accomplishment which, when perfectly and properly displayed, never fails of yielding a high degree of pleasure. But since this pleasure chiefly results from the principle of imitation respecting manner, and not from the purport of the matter communicated; since, comparatively speaking, it is only attainable by few persons, and practised only on particular occasions;—on these accounts it must be refused a place among the modes of useful delivery taught us by general nature, and esteemed a qualification purely anomalous.

These distinctions with regard to a speaker's situation of mind premised, let us see to which

of them an author and his reader may most properly be referred, and how they are circumstanced with regard to one another.

The matter of all books is, either what the author says in his own person, or an acknowledged recital of the words of others: hence an author may be esteemed both an original speaker and a repeater, according as what he writes is of the first or second kind. Now a reader must be supposed either actually to personate the author, or one whose office is barely to communicate what he has said to an auditor. But in the first of these suppositions he would, in the delivery of what is the author's own, evidently commence mimic; which being, as above observed, a character not acknowledged by general nature in this department, ought to be rejected as generally improper. The other supposition therefore must be accounted right; and then, as to the whole matter of the book, the reader is found to be exactly in the situation of a repeater, save that he takes what he delivers from the page before him instead of his memory. It follows then, in proof of our initial proposition, that if we are directed by nature and propriety, the manner of our delivery in reading ought to be inferior in warmth and energy to what we should use, were the language before us the spontaneous effusions of our own hearts in the circumstances of those out of whose mouths it is supposed to proceed.

Evident as the purport of this reasoning is, it has not so much as been glanced at by the writers on the subject we have now entered upon, or any of its kindred ones; which has occasioned a manifest want of accuracy in several of their rules and observations. Among the rest, this precept has been long reverberated from author to author as a perfect standard for propriety in reading—"Deliver yourselves in the same manner you would do, were the matter your own original sentiments uttered directly from the heart." As all kinds of delivery must have many things in common, the rule will in many articles be undoubtedly right; but, from what has been said above, it must be as certainly faulty in respect to several others; as it is certain nature never confounds by like signs two things so very different, as a copy and an original, an emanation darted immediately from the sun, and its weaker appearance in the lunar reflection.

The several observations which tend to perfect the art of reading, relate to proper loudness of voice, distinctness, slowness, propriety of pronunciation, emphasis, tones, pauses, and mode of reading verse. See the various articles: and for a complete and very judicious disquisition on the subject, consult the Introduction to Lindley Murray's English Reader.

READINGS, in criticism. Various readings, *variæ lectiones*, are the different manners of reading the text of authors in ancient manuscripts; where a diversity has arisen from the corruption of time, or the ignorance of copyists.

A great part of the business of the critic lies in settling the readings, by confronting the various readings of the several manuscripts, and considering the agreement of the words and sense.

READING, a borough and the county-town of Berkshire, with a market on Saturday, and three churches. It has the ruins of a rich abbey, built by Henry I. who was interred here in 1133; and, in 1787, in digging the foundation for a house of correction, the remains of that prince were found in a vault, in a leaden coffin. Reading is governed by a mayor, and sends two members to parliament. Its chief trade is in malt. It contains nearly 10,000 inhabitants, is seated on the Kennet, near its confluence with the Thames, 26 miles S.S.E. of Oxford, and 39 W. of London. Lon. 0. 52 W. Lat. 51. 28 N.

READING, the capital of the county of Berks, in Pennsylvania, seated on the Schynkill, 46 miles N.W. of Philadelphia. Lon. 75. 54. W. Lat. 40. 22 N.

READMI'SSION. *s.* (*re* and *admission.*) The act of admitting again (*Arbuthnot*).

To READMI'T. *v. n.* (*re* and *admit.*) To let in again (*Milton*).

To READO'RN. *v. a.* (*re* and *adorn.*) To decorate again; to deck anew (*Blackmore*).

READY. *a.* (*redo*, Swedish; hpaꝺe, nimble, Sax.) 1. Prompt; not delaying (*Temple*). 2. Fit for a purpose; not to seek (*Shakspeare*). 3. Prepared; accommodated to any design (*Milton*). 4. Willing; eager; quick (*Spenser*). 5. Being at the point; not distant; near; about to do or be (*Milton*). 6. Being at hand; next to hand (*Dryden*). 7. Facile; easy; opportune; near (*Hooker*). 8. Quick; not done with hesitation (*Clarissa*). 9. Expedite; nimble; not embarrassed; not slow (*Watts*). 10. *To make* READY. To make preparations.

REA'DY. *ad.* Readily; so as not to need delay (*Numbers*).

REA'DY. *s.* Ready money. A low word (*Arbuthnot*).

REAFFI'RMANCE. *s.* (*re* and *affirmance.*) Second confirmation (*Ayliffe*).

REAGENTS. Reagentia. Tests. In chemistry, such substances as enable the chemist to draw conclusions respecting the nature and properties of the bodies to be examined, by means of those alterations which they suffer themselves, or produce in others. As tests or reagents for alkalies are employed the blue syrup of violets; paper stained red, with a decoction of Fernambuc, or Brazil wood; or stained yellow by the tincture of turmeric root; and the tincture of litmus reddened by a very weak acid, and the red alkanet tincture.

RE'AL. *a.* (*reel*, Fr. *realis*, Latin.) 1. Relating to things, not persons; not personal (*Bacon*). 2. Not fictitious; not imaginary; true; genuine (*Glanville*). 3. (In law.) Consisting of things immoveable, as land (*Child*).

REAL (Cæsar Vichard de St.), a polite French writer, son of a counsellor to the senate of Chamberry in Savoy. He came young to

France, distinguished himself at Paris by several ingenious productions, and resided there a long time without title or dignity, intent upon literary pursuits. He died at Chamberry in 1692, advanced in years, though not in circumstances. He was a man of great parts and penetration, a lover of the sciences, and particularly fond of history. A complete edition of his works was printed at Paris, in 3 vols. 4to. 1745, and another in 6 vols. 12mo.

REAL PRESENCE. See TRANSUBSTANTIATION.

REALGAR. A metallic substance of a red colour, more or less lively and transparent, and often crystallized in brilliant needles. It is formed by a combination of arsenic with sulphur. See ARSENIC.

REALISTS, a sect of school-philosophers formed in opposition to the nominalists. Under the realists are included the Scotists, Thomists, and all excepting the followers of Ocham. Their distinguishing tenet is, that universals are realities, and have an actual existence out of an idea or imagination; or, as they express it in the schools, a *parte rei*; whereas the nominalists contend, that they exist only in the mind, and are only ideas, or manners of conceiving things.—Dr. Odo, or Oudard, a native of Orleans, afterwards abbot of St. Martin de Tournay, was the chief of the sect of the realists. He wrote three books of dialectics, where, on the principles of Boethius and the ancients, he maintained that the object of that art is things, not words; whence the sect took its rise and name.

REA'LITY. *s.* (*realité*, French.) 1. Truth; verity; what is, not what merely seems (*Addison*). 2. Something intrinsically important, not merely matter of show (*Milton*).

To RE'ALIZE. *v. a.* (*realiser*, Fr.) 1. To bring into being or act (*Glanville*). 2. To convert money into land.

RE'ALLY. *ad.* (from *real.*) 1. With actual existence (*South*). 2. In truth; truly; not seemingly only (*Law*).

REALM. *s.* (*roiaulme*, Fr.) 1. A kingdom; a king's dominion (*Milton*). 2. Kingly government (*Pope*).

REA'LTY. *s.* Loyalty: not used (*Milton*).

REAM. *s.* (*rame*, French; *riem*, Dutch.) A bundle of paper containing twenty quires (*Pope*).

To REA'NIMATE. *v. a.* (*re* and *animo*, Lat.) To revive; to restore to life (*Glanville*).

To REANNE'X. *v. a.* (*re* and *annex.*) To annex again (*Bacon*).

To REAP. *v. a.* (ꝛepan, Sax.) 1. To cut corn at harvest (*Shakspeare*). 2. To gather; to obtain (*Hooker*).

To REAP. *v. n.* To harvest (*Psalms*).

REA'PER. *s.* (from *reap.*) One that cuts corn at harvest (*Sandys*).

REA'PINGHOOK. *s.* (*reaping* and *hook.*) A hook used to cut corn in harvest (*Dryden*).

REAR. *s.* (*arriere*, French.) 1. The hinder troop of an army, or the hinder line of a fleet (*Knolles*). 2. The last class; the last in order (*Peacham*).

REAR. *a.* (hꝛene, Saxon.) 1. Raw; half roasted; half sodden. 2. Early. A provincial word (*Gay*).

To REAR. *v. a.* (aꝛæꝛan, Sax.) 1. To raise up (*Esdras*). 2. To lift up from a fall (*Spenser*). 3. To move upward (*Milton*). 4. To bring up to maturity (*Bacon*). 5. To educate; to instruct (*Southern*). 6. To exalt; to elevate (*Prior*). 7. To rouse; to stir up (*Dryden*). 8. To raise; to breed (*Harte*).

REAR, a term frequently used in composition, to denote something behind, or backwards, in respect of another, in opposition to van.

REAR OF AN ARMY, signifies, in general, the hindermost part of an army, battalion, regiment, or squadron; also the ground behind either.

REAR-GUARD, is that body of an army which marches after the main-body; for the march of an army is always composed of an advance-guard, a main body, and a rear-guard; the first and last commanded by a general. The old grand-guards of the camp always form the rear-guard of the army, and are to see that every thing come safe to the new camp.

REAR HALF-FILES, are the three hindmost ranks of the battalion, when it is drawn up six deep.

REAR-LINE, of an army encamped, is always 1200 feet at least from the centre line; both of which run parallel to the front line, as also to the reserve.

REAR-RANK, is the last rank of a battalion, when drawn up, and generally 16 or 18 feet from the centre-line when drawn in open order.

REA'RWARD. *s.* (from *rear.*) 1. The last troop (*Sidney*). 2. The end; the tail; a train behind (*Shakspeare*). 3. The latter part. In contempt (*Shakspeare*).

To REASCE'ND. *v. n.* (*re* and *ascend.*) To climb again (*Spenser*).

To REASCE'ND. *v. a.* To mount again.

REA'SON. *s.* (*raison*, Fr.) 1. The power by which man deduces one proposition from another, or proceeds from premises to consequences (*Milton*). 2. Cause; ground or principle (*Tillotson*). 3. Cause efficient (*Hale*). 4. Final cause (*Locke*). 5. Argument; ground of persuasion; motive (*Tillotson*). 6. Ratiocination; discursive act (*Davies*). 7. Clearness of faculties (*Shakspeare*). 8. Right; justice (*Spenser*). 9. Reasonable claim; just practice (*Taylor*). 10. Rationale; just account (*Boyle*). 11. Moderation; moderate demands (*Addison*).

To REA'SON. *v. n.* (*raisonner*, Fr.) 1. To argue rationally; to deduce consequences justly from premises (*Locke*). 2. To debate; to discourse; to talk; to take or give an account: not in use (*Shakspeare*). 3. To raise disquisitions; to make inquiries (*Milton*).

To REA'SON. *v. a.* To examine rationally. A French mode of speech (*Burnet*).

REASON, *ratio*, a faculty or power of the soul, whereby it distinguishes good from evil, and truth from falsehood.

Or, reason is that principle, whereby, comparing several ideas together, we draw consequences from the relations they are found to have.

Some of the latter school-philosophers define reason to be the comprehenson of many principles which the mind successively can conceive, and from which conclusions may be drawn.

Others conceive reason as no other than the understanding itself, considered as it discourses.

Reason, Mr. Locke observes, comprehends two distinct faculties of the mind; viz. sagacity, whereby it finds intermediate ideas; and illation, whereby it so orders and disposes of them, as to discover what connexion there is in each link of the chain, whereby the extremes are held together; and thereby, as it were, draws into view the truth sought for.

Illation, or inference, consists in nothing but the perception of the connexion there is between the ideas in each step of the deduction, whereby the mind comes to see either the certain agreement or disagreement of any two ideas; as in demonstration, in which it arrives at knowledge; or their probable connexion, on which it gives or withholds its assent; as in opinion.

Sense and intuition reach but a little way: the greatest part of our knowledge depends upon deductions, and intermediate ideas. In those cases, where we must take propositions for true, without being certain of their being so, we have need to find out, examine, and compare, the grounds of their probability: in both cases, the faculty which finds out the means, and rightly applies them to discover certainty in the one, and probability in the other, is that which we call reason.

In reason, therefore, we may consider four degrees: first, the discovering and finding out of proofs. See INVENTION.

Secondly, the regular and methodical disposition of them, and laying them in such order, as that their connection may be plainly perceived. See METHOD.

Thirdly, the perceiving of their connexion (see JUDGMENT); and,

Fourthly, the making a right conclusion.

Reason fails us in several instances: as, first, where our ideas fail.

Secondly, it is often at a loss, because of the obscurity, confusion, or imperfection, of the ideas it is employed about. Thus, having no perfect idea of the least extension of matter, nor of infinity, we are at a loss about the divisibility of matter.

Thirdly, our reason is often at a stand, because it perceives not those ideas which would serve to shew the certain or probable agreement or disagreement of any two other ideas.

Fourthly, our reason is often engaged in absurdities and difficulties, by proceeding upon false principles, which, being followed, lead men into contradictions to themselves, and inconsistency in their own thoughts.

Fifthly, dubious words, and uncertain signs, often puzzle men's reason, and bring them to a nonplus.

Though the deducing one proposition from another be a great part of the office of reason, and that about which it is usually employed; yet the principal act of ratiocination is the finding the agreement or disagreement of two ideas one with another, by the intervention of a third. As a man, by a yard, finds two houses to be of the same length, which could not be brought together to measure their equality by juxta-position. Words have their consequences as the signs of such ideas and things agree or disagree with what they really are; but we observe it only by our ideas.

Hence we may be able to form an idea of that ordinary distinction of things, into such as are according to, those that are above, and those contrary to reason.

Those according to reason are such propositions, whose truth we can discover by examining and tracing those ideas we have from sensation and reflection, and by natural deduction find to be true or probable.

Those above reason are such propositions, whose truth or probability we cannot by reason derive from those principles.

Those contrary to reason are such propositions as are inconsistent with, or irreconcilable to, our clear and distinct ideas.

Thus the existence of one God, is according to reason; the existence of more than one God, is contrary to reason; and the resurrection of the body after death, above reason.

REA'SONABLE. *a.* (*raison*, French.) 1. Having the faculty of reason; endued with reason (*Sidney*). 2. Acting, speaking, or thinking rationally (*Hayward*). 3. Just; rational; agreeable to reason (*Swift*). 4. Not immoderate (*Shakspeare*). 5. Tolerable; being in mediocrity (*Sidney*).

REA'SONABLENESS. *s.* 1. The faculty of reason. 2. Agreeableness to reason (*Clarendon*). 3. Compliance with reason (*Hale*). 4. Moderation.

REA'SONABLY. *ad.* (from *reasonable*.) 1. Agreeable to reason (*Dryden*). 2. Moderately; in a degree reaching to mediocrity (*Bacon*).

REA'SONER. *s.* (*raisonneur*, Fr.) One who reasons; an arguer (*Blackmore*).

REASONING, *ratiocination*, the exercise of that faculty of the mind called reason: or, it is reason deduced into discourse.

The agreement or disagreement of two ideas does not appear from the bare consideration of the ideas themselves, unless some third be called in, and compared, either separately or conjointly therewith: the act, then, whereby from ideas thus disposed and compared, we judge this or that to be so, or not so, is called reasoning. Or, it is that operation of the mind

whereby we infer one thing, i. e. one proposition from two or more propositions premised. Or, again, it is the drawing of a conclusion, which before was either unknown, or dark, or doubtful, from some propositions which are more known and evident. It is the narrowness of the human mind which introduces the necessity of reasoning; for if the mere perception and comparison of two ideas would always show us whether they agree or disagree, then all rational propositions would be matters of intelligence, or first principles, and there would be no use of reasoning, or drawing any consequences. But when we are unable to judge of the truth or falsehood of a proposition in an immediate manner, by the mere contemplation of its subject and predicate, we are then constrained to use a medium, and to compare each of them with some third idea, that by seeing how far they agree or disagree with it, we may be able to judge how far they agree or disagree among themselves.

REA'SONLESS. *a.* Void of reason (*Shakspeare*).

To REASSE'MBLE. *v. a.* (*re* and *assemble.*) To collect anew (*Milton*).

To REASSE'RT. *v. a.* (*re* and *assert.*) To assert anew; to maintain after suspension or cessation (*Atterbury*).

To REASSU'ME. *v. a.* (*reassumo*, Latin.) To resume; to take again (*Denham*).

To REASSU'RE. *v. a.* (*reassurer*, Fr.) To free from fear; to restore from terrour (*Dryden*).

REATE. *s.* A kind of long small grass that grows in water, and complicates itself together (*Walton*).

To REAVE. *v. a.* pret. *reft.* (næpian, Sax.) To take away by stealth or violence (*Carew*).

REALMONT, a town of France, in the department of Upper Garonne, 31 miles N.E. of Toulouse. Lon. 2. 0 E. Lat. 43. 50 N.

REAUMUR (Rene-Antoine-Ferchault, Sieur de), a respectable French philosopher, was born at Rochelle in 1683. After the usual course of school education, he was sent to Poitiers to study philosophy, and, in 1699, to Bourges to study the law, the profession for which he was intended. But philosophy and mathematics having very early been his favourite pursuits, he quitted the law, and repaired to Paris in 1703, to pursue those sciences to the best advantage; and here his character procured him a seat in the academy in the year 1708; which he held till the time of his death, which happened the 18th of November 1757, at 74 years of age.

Reaumur soon justified the choice that was made of him by the Academy. He made innumerable observations, and wrote a great multitude of pieces upon the various branches of natural philosophy. His History of Insects, in 6 vols. quarto, at Paris, is his principal work. Another edition was printed at Holland, in 12 vols. 12mo. He made also great and useful discoveries concerning iron; showing how to change common wrought iron into steel, how to soften cast iron, and to make works in cast iron as fine as in wrought iron. His labours and discoveries concerning iron were rewarded by the duke of Orleans, regent of the kingdom, by a pension of 12 thousand livres, equal to about 500l. sterling; which, however, he would not accept but on condition of its being put under the name of the Academy, who might enjoy it after his death. It was owing to Reaumur's endeavours that there were established in France manufactures of tin plates, of porcelain in imitation of china-ware, &c. They owe to him also a new thermometer, which bears his name, and is pretty generally used on the continent, while that of Fahrenheit is used in England, and some few other places. Reaumur's thermometer is a spirit one, having the freezing point at 0, and the boiling point at 80.

Reaumur is esteemed as an exact and clear writer; and there is an elegance in his style and manner, which is not commonly found among those who have made only the sciences their study. He is represented also as a man of a most amiable disposition, and with qualities to make him beloved as well as admired. He left a great variety of papers and natural curiosities, which he bequeathed to the Academy of Sciences.

The works published by him, are the following:

1. The Art of changing Forged Iron into Steel; of Softening Cast Iron; and of making works of Cast Iron, as fine as of Wrought Iron. Paris, 1722, 1 vol. in 4to.

2. Natural History of Insects, 6 vols. in 4to.

His memoirs printed in the volumes of the Academy of Sciences, are very numerous, amounting to upwards of a hundred, and on various subjects, from the year 1708 to 1763, several papers in almost every volume.

REAUMUR'S THERMOMETER. See THERMOMETER.

REAUMURIA, in botany, a genus of the class polyandria, order pentagynia. Calyx five-leaved; petals five; capsule five-celled, five-valved, many-seeded; seeds woolly. Two species; annuals of Syria.

REBAPTIZATION. *s.* (*rebaptisation*, French.) Renewal of baptism (*Hooker*).

To REBAPTI'ZE. *v. a.* (*rebaptiser*, Fr. *re* and *baptize.*) To baptize again (*Ayliffe*).

To REBA'TE. *v. n.* (*rebattre*, French.) To blunt; to beat to obtuseness; to deprive of keenness (*Creech*).

REBATE, in arithmetic. See DISCOUNT.

REBEC. A Moorish word signifying an instrument with two strings played on with a bow. The Moors brought the rebec into Spain, whence it passed into Italy, and after the addition of a third string, obtained the name of rébeca; whence the old English rebec, or fiddle with three strings.

REBEL, a town of Lower Saxony, in the duchy of Mecklenburg, seated on the lake Muritz, 30 miles SE. of Gustrow. Lon. 12. 36 E. Lat. 53. 32 N.

RE'BEL. *s.* (*rebelle*, French.) One who

opposes lawful authority by violence (*Fenton*).

To REBE'L. *v. n.* (*rebello*, Latin.) To rise in opposition against lawful authority (*Shakspeare*).

REBE'LLER. *s.* (from *rebel.*) One that rebels.

REBE'LLION. *s.* (*rebellion*, Fr. *rebello*, Lat. from *rebel.*) Insurrection against lawful authority (*Milton*).

REBE'LLIOUS. *a.* (from *rebel.*) Opponent to lawful authority (*Deuteronomy*).

REBE'LLIOUSLY. *ad.* In opposition to lawful authority (*Camden*).

REBE'LLIOUSNESS. *s.* (from *rebellious.*) The quality of being rebellious.

To REBE'LLOW. *v. n.* (*re* and *bellow.*) To bellow in return; to echo back a loud noise.

REBOA'TION. *s.* (*reboo*, Lat.) The return of a loud bellowing sound.

To REBOU'ND. *v. n.* (*rebondir*, French; *re* and *bound.*) To spring back; to be reverberated; to fly back in consequence of motion impressed and resisted by a greater power (*Newton*).

To REBOU'ND. *v. a.* To reverberate; to beat back (*Dryden*).

REBOU'ND. *s.* (from the verb.) The act of flying back in consequence of motion resisted; resilition (*Dryden*).

REBU'FF. *s.* (*rebuffade*, Fr. *rebuffo*, Ital.) Repercussion; quick and sudden resistance (*Milton*).

To REBU'FF. *v. a.* (from the noun.) To beat back; to oppose with sudden violence.

To REBU'ILD. *v. n.* (*re* and *build.*) To re-edify; to restore from demolition; to repair (*Tickel*).

REBU'KABLE. *a.* (from *rebuke.*) Worthy of reprehension (*Shakspeare*).

To REBU'KE. *v. a.* (*reboucher*, French.) To chide; to reprehend; to repress by objurgation (*Dryden*).

REBU'KE. *s.* (from the verb.) 1. Reprehension; chiding expression; objurgation (*Pope*). 2. In low language, it signifies any kind of check (*L'Estrange*).

REBU'KER. *s.* (from *rebuke.*) A chider; a reprehender (*Hosea*).

REBUS, a name-device, as Camden Englishes it; or an enigmatical representation of some name, &c. by using figures or pictures, instead of words, or parts of words. Such is that of the gallant mentioned by Camden, who expressed his love to Rose Hill, by painting in the border of his gown a rose, a hill, an eye, a loaf, and a well; which, in the rebus style, is read, *Rose Hill, I love well.* The Picards have the honour of the invention of this notable kind of wit; whence the French, to this day, call it *rebus de Picardie.* Camden adds, that the English first learnt it of them in the reign of our Henry III. by means of the garrisons we then had in Calais, Guienne, and other places bordering on Picardy.

Its origin is by Menage, &c. ascribed to the priests of Picardy, who, it seems, anciently, in carnival time, used every year to make certain libels, entitled, *de rebus quæ geruntur*, being railleries on what intrigues and transactions had passed about the city; wherein they made great use of such sort of equivoques and allusions, breaking and joining words, and supplying them with paintings.

Camden tells us, the rebus was in wonderful esteem among our forefathers; and that he was nobody who could not hammer out of his name an invention by this wit-craft, and picture it accordingly.

The sieur Des Accords has made an ample collection of the most famous rebuses *de Picardie.* And Mr. Camden has done something of the same kind in his Remains.

REBUS, in heraldry, a coat of arms which bears an allusion to the name of the person; as three castles, for Castleton; three cups, for Butler; three conies, for Conisby; a kind of bearings which are of great antiquity.

To REBU'T. *v. n.* (*rebuter*, Fr.) To retire back: obsolete (*Spenser*).

REBUTTER (from the French *bonter*, i. e. *repellere*, to put back or bar), is the answer of defendant to plaintiff's *surrejoinder*; and plaintiff's answer to the rebutter is called a *surrebutter*: but it is very rare the parties go so far in pleading. Rebutter is also where a man by deed or fine grants to warranty any land or hereditament to another; and the person making the warranty, or his heir, sues him to whom the warranty is made, or his heir or assignee, for the same thing; if he who is so sued plead the deed or fine with warranty, and pray judgment, if the plaintiff shall be received to demand the thing which he ought to warrant to the party against the warranty in the deed, &c. this is called a rebutter. And if I grant to a tenant to hold without impeachment of waste, and afterwards implead him for waste done, he may debar me of this action by showing my grant, which is a rebutter.

To RECA'LL. *v. a* (*re* and *call.*) To call back; to call again; to revoke (*Hooker*).

RECA'LL. *s.* (from the verb.) Revocation; act or power of calling back (*Dryden*).

To RECA'NT. *v. a.* (*recanto*, Lat.) To retract; to recall; to contradict what one has once said or done (*Milton*).

To RECA'NT. *v. n.* To revoke a position; to unsay what has been said (*Swift*).

RECANTA'TION. *s.* (from *recant.*) Retractation; declaration contradictory to a former declaration (*Stillingfleet*).

RECA'NTER. *s.* (from *recant.*) One who recants (*Shakspeare*).

To RECAPI'TULATE. *v. a.* (*recapituler*, Fr.) To repeat the sum of a former discourse (*More*).

RECAPITULA'TION. *s.* (from *recapitulate.*) Repetition of the principal points (*Sou.*).

RECAPI'TULATORY. *a.* (from *recapitulate.*) Repeating again (*Garretson*).

To RECA'RRY. *v. a.* (*re* and *carry.*) To carry back (*Walton*).

To RECE'DE. *v. n.* (*recedo*, Latin.) 1. To fall back; to retreat (*Bentley*). 2. To desist; to relax any claim (*Clarendon*).

RECEI'PT. *s.* (*receptum*, Latin.) 1. The act of receiving (*Wiseman*). 2. The place of receiving (*Matthew*). 3. (*recepte*, Fr.) A note given, by which money is acknowledged to have been received. 4. Reception; admission (*Hooker*). 5. Reception; welcome (*Sidney*). 6. (from *recipe.*) Prescription of ingredients for any composition (*Shakspeare*).

RECEI'VABLE. *a.* (*recevable*, Fr.) Capable of being received.

To RECEI'VE. *v. a.* (*recevoir*, Fr. *recipio*, Lat.) 1. To take or obtain any thing as due (*Shakspeare*). 2. To take or obtain from another (*Daniel*). 3. To take any thing communicated (*Locke*). 4. To embrace intellectually (*Locke*). 5. To allow (*Hooker*). 6. To admit (*Watts*). 7. To take as into a vessel (*Acts*). 8. To take into a place or state (*Mark*). 9. To conceive in the mind; to take intellectually (*Shaks.*). 10. To entertain as a guest.

RECEI'VEDNESS. *s.* (from *received.*) General allowance (*Boyle*).

RECEI'VER. *s.* (*receveur*, French.) 1. One to whom any thing is communicated by another (*Donne*). 2. One to whom any thing is given or paid. 3. An officer appointed to receive public money (*Bacon*). 4. One who partakes of the blessed sacrament (*Taylor*). 5. One who co-operates with a robber, by taking the goods which he steals (*Spenser*).

RECEIVER, in pneumatics, a glass vessel for containing the thing on which an experiment in the air-pump is to be made. See PNEUMATICS, and AIR-PUMP.

RECEIVER, in chemistry, a vessel of earth, glass, &c. for receiving any distilled liquor.

RECEIVER. Receiving stolen goods, knowing them to be stolen, is a high misdemeanour at the common law; and by several statutes is made felony and transportation; and in some particular instances, felony without benefit of clergy.

RECEIVER, also signifies an officer, of which there are several kinds, denominated from the particular matters they receive, the places where, or the persons from whom, &c. 1. Receiver of the fines is an officer appointed to receive the money of such persons as compound with the king, upon original writs sued out of chancery. 2. Receiver-general of the duchy of Lancaster, is an officer belonging to the duchy-court, who collects all the revenues, fines, forfeitures, and assessments, within that duchy. 3. Receiver-general of the public revenue, is an officer appointed in every county, to receive the taxes granted by parliament, and remit the money to the treasury.

To RECE'LEBRATE. *v. a.* (*re* and *celebrate.*) To celebrate anew (*Ben Jonson*).

RE'CENCY. *s.* (*recens*, Latin.) Newness; new state (*Wiseman*).

RECE'NSION. *s.* (*recensio*, Latin.) Enumeration; review (*Evelyn*).

RE'CENT *a.* (*recens*, Latin.) 1. New; not of long existence (*Woodward*). 2. Late; not antique (*Bacon*). 3. Fresh; not long dismissed, released, or parted from (*Pope*).

RE'CENTLY. *ad.* Newly; freshly (*Arb.*).

RE'CENTNESS. *s.* (from *recent.*) Newness; freshness (*Hale*).

RECE'PTACLE. *s.* (*receptaculum*, Latin.) A vessel or place into which any thing is received (*Spenser*).

RECEPTACLE. (*receptaculum*, *recipio*, to receive.) In botany. A receptacle.—Basis qua partes fructificationis connectuntur. The base by which the other parts of the fructification are connected.—By Boerhaave named placenta; and by Vaillant thalamus.

1. *Proprium.*—An appropriate or peculiar receptacle: appertaining to one fructification only. Common: connecting several florets or distinct fructifications, so that if any one of them be removed an irregularity is occasioned.—There are instances of this in the umbel, cyme, spadix and rachis, as well as in the compound flowers.

2. *Recept. frutificationis.*—The receptacle of the fructification. Common both to flower and fruit; or embracing the corolla and germ.

Floris.—Receptacle of the flower. The base to which the parts of the flower, exclusive of the germ, are fixed.

Fructus.—Receptacle of the fruit. The base of the fruit only, remote from the receptacle of the flower.

Seminum.—Receptacle of the seeds. The base to which the seeds are fixed: as in adonis.

3. The receptacle may be, *nudum.* Naked. Without chaffs, hairs or bristles.—*Punctatum.* Dotted.—*Pilosum.* Hairy.—*Setosum.* Bristly.—*Paleaceum.* Chaffy.—*Alveolatum* s. *favosum.* Honey-combed; divided into open cells, within each of which a single seed is lodged.

Planum. Flat.—*Convexum.* Convex.—*Subulatum.* Subulate or awl-shaped.—*Ovatum.* Ovate.—*Globosum.* Globular.—*Conicum.* Conical.

RECEPTACULUM CHYLI. (from *recipio*, to receive.) In anatomy. The existence of such a receptacle in the human body is doubted. In brute animals the receptacle of the chyle is situated on the dorsal vertebræ where the lacteals all meet.

RECEPTIBI'LITY. *s.* (*receptus*, Latin.) Possibility of receiving (*Glanville*).

RECE'PTARY. *s.* (*receptus*, Lat.) Thing received: not in use (*Brown*).

RECE'PTION. *s.* (*receptus*, Lat.) 1. The act of receiving (*Brown*). 2. The state of being received (*Milton*). 3. Admission of any thing communicated (*Locke*). 4. Readmission (*Milton*). 5. The act of containing (*Addison*). 6. Treatment at first coming; welcome; entertainment (*Hammond*). 7. Opinion generally admitted (*Locke*). 8. Recovery: not in use.

RECE'PTIVE. *a.* (*receptus*, Lat.) Having the quality of admitting what is communicated (*Glanville*).

RECE'PTORY. *a.* (*receptus*, Lat.) Generally or popularly admitted (*Brown*).

RECE'SS. *s.* (*recessus*, Latin.) 1. Retirement; retreat; withdrawing; secession (*Pri.*). 2. Departure (*Glanville*). 3. Place of retirement; place of secrecy; private abode (*Mil.*). 4. Departure into privacy (*Milton*). 5. Remission or suspension of any procedure (*Bac.*). 6. Removal to distance (*Brown*). 7. Privacy; secrecy of abode (*Dryden*). 8. Secret part (*Hammond*).

RECE'SSION. *s.* (*recessio*, Latin.) The act of retreating.

RECESSION OF THE EQUINOXES. See PRECESSION.

RECHABITES, a kind of religious order among the ancient Jews, instituted by Jonadab the son of Rechab, comprehending only his own family and posterity. Their founder prescribed them three things: first, not to drink any wine; secondly, not to build any houses, but to dwell in tents; and thirdly, not to sow any corn, or plant vines. The Rechabites observed these rules with great strictness, as appears from Jer. xxxv. 6. &c. Whence St. Jerome, in his 13th epistle to Paulinus, calls them *monachi*, monks. Jonadab, their founder, lived under Jehoash king of Judah, contemporary with Jehu king of Israel.

To RECHA'NGE. *v. a.* (*rechanger*, Fr.) To change again (*Dryden*).

To RECHA'RGE. *v. a.* (*récharger*, French.) 1. To accuse in return (*Hooker*). 2. To attack anew (*Dryden*).

RECHASING, among sportsmen, the discovery and driving home of outlying deer, and other beasts, to the district from which they had strayed.

RECHEAT. An old term applied by huntsmen to the series of notes which they wind on the horn to call back the hounds from a false scent, when they have lost their game.

RECHLINGHAUSEN, a town of Germany, in the archbishopric of Cologne, capital of a county of the same name, with a strong citadel, and a chapter of noble ladies. It is seated on the Lippe, 20 miles W. of Ham. Lon. 8. 36 E. Lat. 51. 27 N.

RECIDIVA'TION. *s.* (*recidivus*, Latin.) Backsliding; falling again (*Hammond*).

RECIDI'VOUS. *a.* (*recidivus*, Lat.) Subject to fall again.

RECIPE, in medicine, a prescription or remedy, to be taken by a patient; so called because always beginning with the word recipe, *i. e.* take; which is generally denoted by the abbreviature ℞.

RECI'PIENT. *s.* (*recipiens*, Latin.) 1. The receiver; that to which any thing is communicated (*Glanville*). 2. The vessel into which spirits are driven by the still (*Dec. of Piety*).

RECI'PROCAL. *a.* (*reciprocus*, Latin.) 1. Acting in vicissitude; alternate (*Milton*). 2. Mutual; done by each to each (*L'Estrange*). 3. Mutually interchangeable (*Watts*).

RECIPROCAL, in arithmetic, &c. is the quotient arising by dividing 1 by any number or quantity. So, the reciprocal of 2 is $\frac{1}{2}$; of 3 is $\frac{1}{3}$, and of a is $\frac{1}{a}$, &c. Hence, the reciprocal of a vulgar fraction is found, by barely making the numerator and the denominator mutually change places: so the reciprocal of $\frac{1}{2}$ is $\frac{2}{1}$ or 2; of $\frac{2}{3}$, is $\frac{3}{2}$; of $\frac{a}{b}$, is $\frac{b}{a}$, &c. Hence also, any quantity being multiplied by its reciprocal, the product is always equal to unity or 1: so $\frac{1}{2} \times \frac{2}{1} = \frac{2}{2} = 1$, and $\frac{2}{3} \times \frac{3}{2} = \frac{6}{6} = 1$, and $\frac{a}{b} \times \frac{b}{a} = \frac{ab}{ab} = 1$.

RECIPROCAL PROPORTION, in arithmetic, is when, in four numbers, the fourth is less than the second, by so much as the third is greater than the first; and *vice versa*. This is the foundation of the inverse, or indirect rule of three; thus, 4 : 10 : : 8 : 5. See RULE. Reciprocal proportion is of great use in determining the laws of motion, because in bodies moving with equal momenta the velocities are reciprocally as their masses.

RECIPROCAL TERMS, among logicians, are those which have the same signification; and consequently are convertible, or may be used for each other.

RECIPROCALLY. *ad.* (from *reciprocal.*) Mutually; interchangeably.

RECIPROCALLY, one quantity is reciprocally as another, when the one is greater in proportion as the other is less; or when the one is proportional to the reciprocal of the other. Thus a is reciprocally as b when a is always proportional to $\frac{1}{b}$. So also in mechanics, to perform any given effect, the less the power is, the greater must be the time in performing it, or in a certain sense, what is gained in power is lost in time. If p denote any power or agent, and t the time of performing a given work, then p is as $\frac{1}{t}$, and t is as $\frac{1}{p}$, that is, p and t are reciprocally proportional to each other.

RECI'PROCALNESS. *s.* (from *reciprocal.*) Mutual return; alternateness (*Decay of Piety*).

To RECI'PROCA'TE. *v. n.* (*reciprocus*, Latin.) To act interchangeably; to alternate (*Sewel*).

RECIPROCA'TION. *s.* (*reciprocatio*, Latin.) Alternation; action interchanged.

RECI'SION. *s.* (*recisus*, Latin.) The act of cutting off.

RECI'TAL. *s.* (from *recite.*) 1. Repetition; rehearsal (*Addison*). 2. Narration (*Addison*). 3. Enumeration (*Prior*).

RECITA'TION. *s.* (from *recite.*) Repetition; rehearsal (*Hammond*).

RECITATIVE. A species of musical recitation forming the medium between air and rhetorical declamation, and in which the composer and performer, rejecting the rigorous rules of time, endeavour to imitate the inflexions, accent, and emphasis, of natural speech.

Recitative, so called because its true province lies in narration and recital, was first

introduced in the year 1660, by Signor Emilia del Cavaliere, at Rome, and was so powerfully recommended by its effect as to be speedily adopted in other parts of Italy, and, by degrees, through the rest of Europe.

The force and beauty of this species of composition will ever, in a considerable degree, depend on the character of the language in which it is used; as that is more or less accented and melodious, so the more or less natural and striking will be the effect of the recitative.

The ancient Greeks, whose language itself was melody, recited all their poetry in a kind of recitative, and from the musical tones of their syllables they could, as it were, sing in speaking. But all the modern languages, not excepting even the Italian, are too distant from that musical sweetness to admit of that melodious intonation, and we are consequently obliged either to sing or to speak; we cannot do as it were both at the same time: and it is this distinction which has rendered recitative, or artificial declamation, so necessary to the moderns: the transition from air to natural speech would in our Oratorio, serious Opera, or cantata, be too abrupt not to offend and disgust the ear.

There is no province of musical composition in which genius and science have an ampler scope for their fairest and fullest display than in recitative; nor upon success in which connoisseurs more highly reckon, because they know there is none in which excellence is more difficult of attainment. In Italy it is sufficient to excel in recitative to be ranked with the most illustrious of their composers, and some masters have been immortalized for their talents in this species of writing.

But however highly we may with justice reckon upon the beauty and value of good recitative, though it be nothing less than a species of unmeasured melody, highly impassioned and strongly expressive, and forms an union between the air and the words at once gratifying to the ear and consonant to the feelings, and always introduces the song by which it is succeeded with a heightened and interesting effect, yet it ought nevertheless to be sparingly employed, and should never continue longer at a time than the contexture and business of the scene absolutely demands.

Most vocal composers, from Emilia down to those of the present day, do not appear to have been sufficiently attentive to this necessary brevity, nor sufficiently aware that however beautiful and interesting recitative may be in itself, when duly limited, it becomes wearisome the moment it exceeds a certain length, and by previously fatiguing the attention, not only enfeebles its own intended effect, but defeats the grand object of advantageously preparing the ear for the approaching melody.

RECITATIVE ACCOMPANIED. A recitative is said to be accompanied when besides the bass there are parts for other instruments; as violins, hautboys, flutes, &c. When the recitative is measured, *i. e.* performed to the rules of time, the accompanists have only to observe those rules: but when unmeasured, as recitatives generally are, the instrumental performers take for the guide of their time the syllabic progress of the singer; for which purpose the words as well as notes of the vocal part are written in their books, on separate staves under the notes of the accompaniment. (*Busby*).

To RECI'TE. *v. a.* (*recito*, Latin.) To rehearse; to repeat; to enumerate; to tell over.

RECI'TE. *s.* Recital: not in use (*Temple*).

To RECK. *v. n.* (рecan, Saxon). To care; to heed; to mind: out of use (*Milton*).

To RECK. *v. a.* To heed; to care for (*Shakspeare*).

RE'CKLESSNESS. *s.* (from *reck.*) Carelessness; negligence (*Sidney*).

RE'CKLESS. *a.* (рeccelear, Sax.) Careless; heedless; mindless (*Shakspeare*).

To RE'CKON. *v. a.* (рeccan, Saxon.) 1. To number; to count (*Crashaw*). 2. To esteem; to account (*Hooker*). 3. To assign in an account (*Romans*).

To RE'CKON. *v. n.* 1. To compute; to calculate (*Addison*). 2. To state an account (*Shakspeare*). 3. To charge to account (*Ben Jonson*). 4. To pay a penalty (*Sanderson*). 5. To call to punishment (*Tillotson*). 6. To lay stress or dependance upon (*Temple*).

RE'CKONER. *s.* (from *reckon.*) One who computes; one who calculates cost.

RE'CKONING. *s.* (from *reckon.*) 1. Computation; calculation. 2. Account of time (*Sandys*). 3. Accounts of debtor and creditor (*Daniel*). 4. Money charged by an host (*Shakspeare*). 5. Account taken (*Kings*). 6. Esteem; account; estimation (*Hooker*).

RECKONING, OF A SHIP'S RECKONING, in navigation, is that account, whereby at any time it may be known where the ship is, and on what course or courses she is to steer, in order to gain her port; and that account, taken from the log-board, is called the dead reckoning. See NAVIGATION.

To RECLA'IM. *v. a.* (*réclamo*, Lat.) 1. To reform; to correct (*Brown*). 2. (*reclamer*, French.) To reduce to the state desired (*Bacon*). 3. To recall; to cry out against (*Dryden*). 4. To tame (*Dryden*).

RECLAI'MANT. *s.* (from *reclaim.*) Contradicter (*Waterland*).

RECLINATE LEAF, in botany, a reclined leaf. Quod deorsum curvatur, ut apex fiat basi inferior; quibusdam etiatum reflexum dicitur. Philos. Bot.—Deorsum flexum, ut arcus sit basi inferior, apice adscendente. Delin. pl. Bent downwards, so that the point of the leaf is lower than the base. The latter explanation seems very different; if we understand it rightly, as meaning that the bow is lowest at the base, and rises at the point. In foliation, this term implies, that the leaves are bent downwards towards the petiole: as in podophyllum, aconitum, anemone, adoxa.

RECLINATE STEM. A reclined stem. Bowed towards the earth: as in ficus.

RECLINATION *of a plane in dialling.* See DIALLING.

To RECLI'NE. *v. a.* (*reclino*, Latin.) To lean back; to lean sidewise (*Addison*).

To RECLI'NE. *v. n.* To rest; to repose; to lean.

RECLI'NE. *a.* (*reclinis*, Latin.) In a leaning posture (*Milton*).

To RECLO'SE. *v. a.* (*re* and *close*.) To close again (*Pope*).

To RECLU'DE. *v. a.* (*recludo*, Latin.) To open (*Harvey*).

RECLU'SE. *a.* (*reclus*, French; *reclusus*, Latin.) Shut up; retired (*Decay of Piety*).

RECLU'SE. *s.* A retired person (*Hammond*).

RECOAGULA'TION. *s.* (*re* and *coagulation*.) Second coagulation (*Boyle*).

To RECOGNI'SE. *v. a.* (*recognosco*, Lat.) 1. To acknowledge; to recover and avow knowledge of any person or thing (*Dryden*). 2. To review; to re-examine (*South*).

RECOGNISEE'. *s.* He in whose favour the bond is drawn.

RECO'GNISOR. *s.* He who gives the recognisance.

RECOGNI'TION. *s.* (*recognitio*, Latin.) 1. Review; renovation of knowledge (*Hooker*). 2. Knowledge confessed (*Grew*). 3. Acknowledgment; memorial (*Bacon*).

RECO'GNIZANCE. *s.* (*recognisance*, Fr.) 1. Acknowledgment of person or thing. 2. Badge (*Shakspeare*).

RECOGNIZANCE, in law, is an obligation of record, which a man enters into before some court of record, or magistrate duly authorized, with condition to the same particular act; as to appear at the assizes or quarter-sessions, to keep the peace, &c. If the party does not comply with it, the recognizance is estreated into the Exchequer. In some cases the court will upon motion respite, and in some discharge the recognizance; but all parties should be careful to apply in good time to the court where the recognizance is to be returned.

To RECO'IL. *v. n.* (*reculer*, French.) 1. To rush back in consequence of resistance (*Milton*). 2. To fall back (*Spenser*). 3. To fail; to shrink (*Shakspeare*).

RECOIL, or REBOUND, the resilition, or flying backward of a body, especially a fire-arm. This is the motion by which, upon explosion, it starts or flies backwards; and the cause of it is the resistance of the ball and the impelling force of the powder, which acts equally on the gun and on the ball. It has been commonly said by authors, that the momentum of the ball is equal to that of the gun with its carriage together; but this is a mistake; for the latter momentum is nearly equal to that of the ball and half the weight of the powder together, moving with the velocity of the ball. So that, if the gun, and the ball with half the powder, were of equal weight, the piece would recoil with the same velocity as the ball is discharged. But the heavier any body is, the less will its velocity be, to have the same momentum, or force; and therefore so many times as the cannon and carriage is heavier than the ball and half the powder, just as many times will the velocity of the ball be greater than that of the gun; and in the same ratio nearly is the length of the barrel before the charge, to the quantity the gun recoils in the time the ball is passing along the bore of the gun. So, if a 24 pounder of 10 feet long be 6400lb. weight, and charged with 6lb. of powder; then, when the ball quits the piece, the gun will have recoiled $\frac{28}{6400} \times 10 = \frac{7}{160}$ of a foot, or nearly half an inch.

To RECOI'N. *v. a.* (*re* and *coin*.) To coin over again (*Addison*).

RECOI'NAGE. *s.* (*re* and *coinage*.) The act of coining anew (*Bacon*).

To RECOLLE'CT. *v. a.* (*recollectus*, Lat.) 1. To recover to memory (*Watts*). 2. To recover reason or resolution (*Dryden*). 3. To gather what is scattered; to gather again (*Boyle*).

RECOLLE'CTION. *s.* (from *recollect*.) Recovery of notion; revival in the memory.

To RECO'MFORT. *v. a.* (*re* and *comfort*.) 1. To comfort or console again (*Sidney*). 2. To give new strength (*Bacon*).

To RECOMME'NCE. *v. a.* (*recommencer*, French.) To begin anew.

To RECOMME'ND. *v. a.* (*recommender*, Fr.) 1. To praise to another (*Dryden*). 2. To make acceptable (*Pope*). 3. To commit with prayers (*Acts*).

RECOMME'NDABLE. *a.* (*recommendable*, French.) Worthy of recommendation or praise (*Glanv.*).

RECOMMENDA'TION. *s.* (*recommendation*, French.) 1. The act of recommending. 2. That which secures to one a kind reception from another (*Dryden*).

RECOMME'NDATORY. *a.* (from *recommend*.) That commends to another (*Swift*).

RECOMME'NDER. *s.* (from *recommend*.) One who recommends (*Atterbury*).

To RECOMMI'T. *v. a.* (*re* and *commit*.) To commit anew (*Clarendon*).

To RECOMPA'CT. *v. a.* (*re* and *compact*.) To join anew (*Donne*).

To RE'COMPENCE. *v. a.* (*recompenser*, Fr.) 1. To repay; to requite (*Chronicles*). 2. To give in requital (*Romans*). 3. To compensate; to make up by something equivalent (*Knolles*). 4. To redeem; to pay for (*Numb.*).

RE'COMPENSE. *s.* (*recompense*, French.) 1. Reward; something given as an acknowledgment of merit (*Shakspeare*). 2. Equivalent; compensation (*Clarendon*).

RECOMPI'LEMENT. *s.* (*re* and *compilement*.) New compilement (*Bacon*).

To RECOMPO'SE. *v. a.* (*recomposer*, Fr.) 1. To settle or quiet anew (*Taylor*). 2. To form or adjust anew (*Boyle*).

RECOMPOSI'TION. *s.* Composition renewed.

To RE'CONCILE. *v. a.* (*reconcilier*, Fr.) 1. To make to like again (*Shakspeare*). 2. To make to be liked again (*Clarendon*). 3. To make any thing consistent (*Locke*). 4. To restore to favour (*Ezekiel*).

RECONCI'LEABLE. *a.* (*reconciliable*, Fr.) 1. Capable of renewed kindness. 2. Consistent; possible to be made consistent (*Hammond*).

RECONCI'LEABLENESS. *s.* 1. Consistence; possibility to be reconciled (*Hammond*). 2. Disposition to renew love.

RECONCI'LEMENT. *s.* (from *reconcile.*) 1. Reconciliation; renewal of kindness; favour restored (*Sid.*). 2. Friendship renewed (*Milt.*).

RECONCI'LER. *s.* (from *reconcile.*) 1. One who renews friendship between others. 2 One who discovers the consistence between propositions (*Norris*).

RECONCILIA'TION. *s.* (*reconciliatio*, Lat.) 1. Renewal of friendship. 2. Agreement of things seemingly opposite; solution of seeming contrarieties (*Rogers*). 3. Atonement; expiation (*Hebrews*).

To RECONDE'NSE. *v. a.* (*re* and *condense.*) To condense anew (*Boyle*).

RECO'NDITE. *a.* (*reconditus*, Latin.) Secret; profound; abstruse (*Felton*).

To RECONDU'CT. *v. a.* (*reconduit*, Fr.) To conduct again (*Dryden*).

To RECONJOI'N. *v. a.* (*re* and *conjoin.*) To join anew (*Boyle*).

RECONNOITRE, in military affairs, implies to view and examine the state of things, in order to make a report thereof. Reconnoitring parties are those sent to observe the country, and the enemy, to remark the routes, conveniences, and inconveniences of the first; the position, march, or forces of the second.

To RECO'NQUER. *v. a.* (*reconquerir*, Fr.) To conquer again (*Davis*).

To RECO'NSECRATE. *v. a.* (*re* and *consecrate.*) To consecrate anew (*Ayliffe*).

To RECONVE'NE. *v. a.* (*re* and *convene.*) To assemble anew (*Clarendon*).

To RECONVE'Y. *v. a.* (*re* and *convey.*) To convey again (*Denham*).

To RECO'RD. *v. a.* (*recordor*, Latin.) 1. To register any thing, so that its memory may not be lost (*Shakspeare*). 2. To celebrate; to cause to be remembered solemnly (*Fairfax*).

RE'CORD. *s.* (*record*, French.) Register; authentic memorial (*Shakspeare*).

RECORD, an act committed to writing in any of the king's courts; during the term wherein it is written, is alterable, being no record; but that term once ended, and the act duly inrolled, it is a record, and of that credit, which admits of no alteration on proof to the contrary.

RECORD, among fowlers. A bird is said to record, when it begins to tune or sing within itself; or to form its notes, or dispose its organs for singing. The cock thrush is distinguished from the hen in recording; the first being more loud and frequent in it than the second. Instances have been known of birds beginning to record when they were not a month old. This first essay does not seem to have the least rudiments of the future song; but, as the bird grows older and stronger, one may perceive what the nestling is aiming at. A young bird commonly continues to record for ten or eleven months, when he is able to execute every part of his song, which afterwards continues fixed, and is scarcely ever altered. The term record is probably derived from a musical instrument, formerly used in England, called a recorder; which seems to have been a species of flute, and was probably used to teach young birds to pipe tunes. Lord Bacon describes this instrument (in his Second Century of Experiments) to have been straight, to have had a smaller and greater bore, both above and below, to have required very little breath from the blower, and to have had what he calls a sipple or stopper.

RECORDE (Robert), a learned physician and mathematician, was born of a good family in Wales, and flourished in the reigns of Henry VIII. Edward VI. and Mary. There is no account of the exact time of his birth, though it must have been early in the 16th century, as he was entered of the university of Oxford about the year 1525, where he was elected fellow of Allsouls college in 1531. Making physic his profession, he went to Cambridge, where he was honoured with the degree of doctor in that faculty in 1545, and highly esteemed by all that knew him for his great knowledge in several arts and sciences. He afterwards returned to Oxford, where, as he had done before he went to Cambridge, he publicly taught arithmetic, and other branches of the mathematics, with great applause. It seems he afterwards repaired to London, and it has been said he was physician to Edward VI. and Mary, to which princes he dedicates some of his books; and yet he ended his days in the King's-bench prison, Southwark, where he was confined for debt, in the year 1558, at a very immature age.

Recorde published several mathematical books, which are mostly in dialogue, between the master and scholar. He also wrote various tracts on medicine and natural history.

RECORDARE, or RECORDARI FACIAS, in law, a writ directed to the sheriff, to remove a cause depending in an inferior court, or court of ancient demesne, hundred, or county, to the King's Bench or Common Pleas.

RECORDA'TION. *s.* (*recordatio*, Latin.) Remembrance: not in use (*Shakspeare*).

RECO'RDER. *s.* (from *record.*) 1. One whose business is to register any events.

RECORDER, a person whom the mayor and other magistrates of a city or corporation associate to them, for their better direction in matters of justice, and proceedings in law; on which account this person is generally a counsellor, or other person well skilled in the law. The recorder of London is chosen by the lord-mayor and aldermen; and, as he is held to be the mouth of the city, he delivers the judgment of the courts, and records and certifies the city customs.

RECORDER. An old wind instrument somewhat resembling a flute, but of a smaller bore and shriller tone. It is said to have had six holes, and to have answered to the tibia

minor, or flajeolet, of Mersennus. This instrument has been by some musical authors confounded with the flute; and we meet with old books of instruction for the flute, the directions of which are also professedly given for the recorder.

To RECOU'CH. *v. n.* (*re* and *couch.*) To lie down again (*Wotton*).

To RECO'VER. *v. a.* (*recouvrer*, French.) 1. To restore from sickness or disorder (*Dry.*). 2. To repair (*Rogers*). 3. To regain; to get again (*Knolles*). 4. To release (*Timothy*). 5. To attain; to reach: not in use (*Shakspeare*).

To RECO'VER. *v. n.* To grow well from a disease, or any evil (*Milton*).

RECO'VERABLE. *a.* (*recouvrable*, Fr.) 1. Possible to be restored from sickness. 2. Possible to be regained (*Clarendon*).

RECO'VERY. *s.* (from *recover.*) 1. Restoration from sickness (*Taylor*). 2. Power or act of regaining (*Shakspeare*). 3. The act of cutting off an entail (*Shakspeare*).

RECOVERY, in law, the name of a species of conveyance of great effect and much utility. Common recoveries were invented by the ecclesiastics to elude the statutes of mortmain; and afterwards encouraged by the courts at law, in order to put an end to all fettered inheritances, and bar not only all estates tail, but also all remainders and reversions expectant thereon. A common recovery is so far like a fine, that it is a suit or action, either actual or fictitious; and in it, the lands are recovered against the tenant of the freehold; which recovery by a supposed adjudication of the right, binds all persons, and vests a free and absolute fee simple in the recoverer. And a common recovery is now looked upon as the best assurance, except an act of parliament, that purchasers can have.

There must be three persons at least to make a common recovery, a recoverer, a recoveree, and a vouchee. The recoverer is the plaintiff or demandant, that brings the writ of entry. The recoveree is the defendant or tenant of the land, against whom the writ is brought. The vouchee is he whom the defendant or tenant voucheth or calls to warranty of the land in demand, either to descend the right, or to yield him other lands in value, according to a supposed agreement. And this being by consent and permission of the parties, it is therefore said that a recovery is suffered.

A common recovery may be had of such things, for the most part, as pass by a fine. An use may be raised upon a recovery, as well as upon a fine; and the same rules are generally to be observed and followed for the guiding and directing the uses of a recovery, as are observed for the guidance and direction of a fine. That is to say, that when a fine is levied, or a recovery is suffered, a deed is made between the parties really interested, which declares the purposes of the fine or recovery, and this deed is called a deed to lead or to declare the uses according as it is made before or after the fine or recovery. To enter at full into the learning of fines and recoveries would be impossible in a general dictionary. It is sufficient to say that both of them are in the nature of a sham suit, while one of which is compromised and the other carried on to judgment by default between the parties really interested, and the use of them is to enable a married woman to make a good conveyance, and a tenant in tail to turn his estate into an estate in fee, or as it is called, to dock or bar the entail. See FINE and ESTATE.

To RECO'UNT. *v. a.* (*reconter*, Fr.) To relate in detail; to tell distinctly (*Shakspeare*).

RECO'UNTMENT. *s.* (from *recount.*) Relation; recital (*Shakspeare*).

RECOU'RED, for *recovered*, or *recured.*

RECOU'RSE. *s.* (*recursus*, Lat. *recurs*, Fr.) 1. Frequent passage: obsolete (*Shakspeare*). 2. Return; new attack (*Brown*). 3. Application as for help or protection (*Wotton*). 4. Access (*Shakspeare*).

RECOU'RSEFUL. *a.* (from *recourse.*) Moving alternately (*Drayton*).

RECRE'ANT. *a.* (*recriant*, French) 1. Cowardly; meanspirited; subdued; crying out for mercy (*Spenser*). 2. Apostate; false (*Milton*).

To RE'CREATE. *v. a.* (*recreo*, Latin.) 1. To refresh after toil; to amuse or divert in weariness (*Dryden*). 2. To delight; to gratify (*More*). 3. To relieve; to revive (*Harvey*).

RECREA'TION. *s.* (from *recreate.*) 1. Relief after toil or pain; amusement in sorrow or distress (*Sidney*). 2. Refreshment; amusement; diversion (*Hol.*).

RE'CREATIVE. *a.* (from *recreate.*) Refreshing; giving relief after labour or pain; amusing; diverting (*Taylor*).

RE'CREATIVENESS. *s.* (from *recreative.*) The quality of being recreative.

RE'CREMENT. *s.* (*recrementum*, Latin.) Dross; spume; superfluous or useless parts (*Boyle*).

RECREME'NTAL. RECREMENTI'TIOUS. *a.* (from *recrement.*) Drossy.

To RECRI'MINATE. *v. n.* (*recriminer*, Fr.) To return one accusation with another (*Still.*).

To RECRI'MINATE. *v. a.* To accuse in return (*South*).

RECRIMINA'TION. *s.* (*recrimination*, Fr.) Return of one accusation with another (*Gov. of the Tongue*).

RECRIMINA'TOR. *s.* (from *recriminate.*) He that returns one charge with another.

RECRUDE'SCENT. *a.* (*recrudescens*, Lat.) Growing painful or violent again.

To RECRUI'T. *v. a.* (*recruter*, French.) 1. To repair any thing wasted by new supplies (*Newton*). 2. To supply any army with new men (*Clarendon*).

To RECRUI'T. *v. n.* To raise new soldiers (*Addison*).

RECRUI'T. *s.* (from the verb.) 1. Supply of any thing wasted (*Clarendon*). 2. A new soldier (*Dryden*).

RECTANGLE, in geometry, the same with a right-angled parallelogram. See GEOMETRY and PARALLELOGRAM.

RECTANGLED, RECTANGULAR, or RIGHT-ANGLED, appellations given to figures and solids which have one or more right angles: thus a triangle with one right angle, is termed a rectangled triangle; also parallelograms with right angles, squares, cubes, &c. are rectangular. Solids, as cones, cylinders, &c. are also said to be rectangular with respect to their situation, when their axes are perpendicular to the plane of the horizon.

RECTA'NGULAR. *a.* (*rectangulaire*, Fr.) Right-angled; having angles of ninety degrees (*Wotton*).

RECTA'NGULARLY. *ad.* (from *rectangular.*) With right angles (*Brown*).

RECTIFIABLE. *a.* (from *rectify*). Capable to be set right (*Brown*).

RECTIFICATION. *s.* (*rectification*, Fr.) 1. The act of setting right what is wrong (*For.*).

RECTIFICATION. (from *rectifico*, to make clean). In chemistry, a second distillation, in which substances are purified by their more volatile parts being raised by heat carefully managed; thus, spirit of wine, æther, &c. are rectified by their separation from the less volatile and foreign matter which altered or debased their properties. See SPIRITS DISTILLED.

RECTIFICATION, in geometry, is the finding of a right line equal to a curve. The rectification of curves is a branch of the higher geometry, a branch in which the use of the inverse method of fluxions is especially useful. This is a problem to which all mathematicians, both ancient and modern, have paid the greatest attention, and particularly as to the rectification of the circle, or finding the length of the circumference, or a right line equal to it; but hitherto without the perfect effect: upon this also depends the quadrature of the circle, since it is demonstrated that the area of a circle is equal to a right-angled triangle, of which one of the sides about the right angle is the radius, and the other equal to the circumference: but it is much to be feared that neither the one nor the other will ever be accomplished. Innumerable approximations however have been made, from Archimedes, down to the mathematicians of the present day. See CIRCLE and CIRCUMFERENCE.

The first person who gave the rectification of any curve was Mr. Neal, son of sir Paul Neal, as we find at the end of Dr. Wallis's treatise on the Cissoid; where he says, that Mr. Neal's rectification of the curve of the semicubical parabola was published in July or August, 1657. Two years after, viz. in 1659, Van Haureat, in Holland, also gave the rectification of the same curve; as may be seen in Schooten's Commentary on Des Cartes's Geometry.

The most comprehensive method of rectification of curves, is by the inverse method of fluxions, which is thus: let ACc pl. 149. fig. 1. be any curve line, AB an abscis, and BC a perpendicular ordinate; also *bc* another ordinate indefinitely near to BC; and C*d* drawn parallel to the abscis AB. Put the abscis AB $= x$, the ordinate BC $= y$, and the curve AC $= z$: then is C*d* $=$ B*b* $= \dot{x}$, the fluxion of the abscis AB, and $cd = \dot{y}$, the fluxion of the ordinate BC, also C*c* $= \dot{z}$, the fluxion of the curve AB. Hence because C*cd* may be considered as a plane right-angled triangle, $Cc^2 = Cd^2 + cd^2$, or $\dot{z}^2 = \dot{x}^2 + \dot{y}^2$; and therefore $\dot{z} = \sqrt{\dot{x}^2 + \dot{y}^2}$ which is the fluxion of the length of any curve; and consequently, out of this equation expelling either $\dot{x}$ or $\dot{y}$, by means of the particular equation expressing the nature of the curve in question, the fluents of the resulting equation, being then taken, will give the length of the curve, in finite terms when it is rectifiable, otherwise in an infinite series, or in a logarithmic or exponential, &c. expression, or by means of some other curve, &c.

Ex. 1. *To rectify the common parabola.*—In this case, the equation of the curve is $2ax = y^2$, where a is half the parameter. The fluxion of this equation is $2a\dot{x} = 2y\dot{y}$, and hence $\dot{x}^2 = \frac{y^2\dot{y}^2}{a^2}$; this being substituted in the general equation $\dot{z} = \sqrt{\dot{x}^2 + \dot{y}^2}$, it becomes $\dot{z} = \frac{\dot{y}\sqrt{aa+yy}}{a}$; the correct fluents of which give $z = \frac{y\sqrt{aa+yy}}{2a} + \frac{1}{2}a \times$ hyp. log. of $\frac{y+\sqrt{aa+yy}}{a}$, which is the length of the curve AC, when it is a parabola.

And the same might be expressed by an infinite series, by expanding the quantity $\sqrt{aa+yy}$.

Ex. 2. *To rectify the circle.*—The equation of the circle may be expressed either in terms of the sine, or versed sine, or tangent, or secant, &c. and the radius. Let therefore the radius of the circle be DA or DC $= r$, the versed sine AB $= x$, the right sine BC $= y$, the tangent CE $= t$, and the secant DE $= s$; then, by the nature of the circle, we have these equations, $y^2 = 2rx - x^2 = \frac{r^2t^2}{r^2+t^2} = \frac{s^2-r^2}{s^2}r^2$; and by means of the fluxions of these equations, with the generalequation $\dot{z}^2 = \dot{x}^2 + \dot{y}^2$, are obtained the following fluxional forms for the fluxion of the curve, the fluent of any one of which will be the curve itself, viz.

$$\dot{z} = \frac{r\dot{x}}{\sqrt{2rx-xx}} = \frac{r\dot{y}}{\sqrt{rr-yy}} = \frac{r^2\dot{t}}{r^2+t^2} = \frac{r\dot{s}}{\sqrt{s^2-r^2}},$$

Hence the value of the curve, from the fluent of each of these, gives the four following forms, in series, viz. the curve, putting $d = 2r$ the diameter, is z

$$= (1 + \frac{x}{2.3d} + \frac{3x^2}{2.4.5d^2} + \frac{3.5x^3}{2.4.6.7d^3} \&c.)\sqrt{dv},$$

$$= (1 + \frac{y^2}{2.3r^2} + \frac{3y^4}{2.4.5r^4} + \frac{3.5y^6}{2.4.6.7r^6} \&c.)\, y,$$

$$= (1 - \frac{t^2}{3r^2} + \frac{t^4}{5r^4} - \frac{t^6}{7r^6} + \frac{t^8}{9r^8} \quad \&c.)\, t,$$

$$= (\frac{s-r}{s} + \frac{s^3-r^3}{2.3s^3} + \frac{3(s^5-r^5)}{2.4.5s^5} \quad \&c.)\, r.$$

It is evident that the simplest of these series is the third, or that which is expressed in terms of the tangent. It will therefore be the properest form to calculate an example by in numbers. And for this purpose it will be convenient to assume some arc whose tangent, or at least its square, is known to be some small finite number. Now the arc of 45° it is known has its tangent equal to the radius; and therefore, taking the radius $r = 1$, and consequently the tangent of 45° or $t = 1$ also, in this case the arc of 45° to the radius 1 or the quadrant to the diameter 1, will be $= 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9}$ &c. But as this series converges very slowly, some smaller arch must be taken, that the series may converge faster; such as the arc of 30°, whose tangent is $\sqrt{\frac{1}{3}} = .5773502$, or its square $t^2 = \frac{1}{3}$; and hence, after the first term, the succeeding terms will be found by dividing always by 3, and these quotients divided by the absolute numbers 3, 5, 7, 9, &c.; and lastly adding every other term together into two sums, the one the sum of the positive terms, and the other the sum of the negative ones, then lastly the one sum taken from the other leaves the length of the arc of 30°, which is the 12th part of the whole circumference when the radius is 1, or the 6th part when the diameter is 1, and consequently 6 times that arc will be the length of the whole circumference to the diameter 1; therefore multiply the 1st term $\sqrt{\frac{1}{3}}$ by 6, and the product is $\sqrt{\frac{36}{3}}$ or $\sqrt{12} = 3.4641016$; hence the operation will be conveniently made as follows:

		+ Terms.	− Terms.
1)	4.4641016	(3.4641016	
3)	1.1547005	(	0.3849002
5)	3849002	(769800	
7)	1283001	(	183286
9)	427667	(47519	
11)	142556	(	12960
13)	47519	(3655	
15)	15840	(	1056
17)	5280	(311	
19)	1760	(	93
21)	587	(28	
23)	196	(	8
25)	65	(3	
27)	22	(	1
		+ 3.5462332	− 0.4046406
		− 0.4046406	
		3.1415926 the circumference.	

For more on this subject, see Hutton's Mensuration, in various places; and the treatises on Fluxions by Simpson, Vince, and Dealtry; also Dr. Hutton's paper on the rectification of the circle, in Phil. Trans. vol. 66, or in the 1st vol. of his own 8vo. Tracts, now publishing.

RECTIFIER, in navigation, an instrument consisting of two parts, which are two circles either laid one upon, or let into, the other, and so fastened together in their centres, that they represent two compasses, one fixed, the other moveable; each of them divided into the thirty-two points of the compass, and three hundred and sixty degrees, and numbered both ways, from the north and the south, ending at the east and west, in ninety degrees.

To RE'CTIFY. *v. a.* (*rectifier*, French.) 1. To make right; to reform; to redress (*Shakspeare*). 2. To exalt and improve by repeated distillation (*Grew*).

RECTILI'NEAR. RECTILI'NEOUS. *a.* (*rectus* and *linea*, Latin.) Consisting of right lines (*Newton*).

RECTITUDE. *s.* (*rectitude*, French.) 1. Straightness; not curvity. 2. Rightness; uprightness; freedom from moral curvity or obliquity (*King Charles*).

RECTO, in law, a writ of right, which is of so high a nature, that whereas other writs in real actions are only to recover the possession of the land or tenements in question, which have been lost by our ancestors or ourselves; this aims to recover both the seisin which some of our ancestors or we had, and also the property of the hiring whereof the ancestor died not seised as of fee; and whereby are pleaded and tried both their rights together, viz. as well of possession as of property; so that if a man ever loses his cause upon this writ, either by judgment or assize, he is without remedy. Pract. Lib. 5.

RECTO DE ADVOCATIONE ECCLESIÆ, a writ of right, lying where a man has a right of advowson, and the parson of the church dying, a stranger presents his clerk to the church; and he not having brought his action of quare impedit, nor darrein presentment, within six months, but suffered the stranger to usurp upon him.

RECTO DE DOTE, a writ of right of dower, which lies for a woman who has received part of her dower, and purposes to demand the remainder in the same town, against the heir, or his guardian if he is a ward.

RECTO DE DOTE UNDE NIHIL HABET, a writ of right which lies in a case, where the husband having divers lands or tenements, has assured no dower to his wife, and she thereby is driven to sue for her thirds, against the heir or his guardian.

RECTO QUANDO DOMINUS REMISIT, a writ of right, which lies in cases, where lands or tenements in the seigniory of any lord are in demand by a writ of right.

RECTOR, a term applied to several persons whose offices are very different; as, 1. The rector of a parish is a clergyman that has the charge and cure of a parish, and possesses all the tythes, &c. 2. The same name is also given to the chief elective officer in several

foreign universities, particularly in that of Paris. 3. Rector is also used in several convents for the superior officer who governs the house; and the jesuits give this name to the superiors of such of their houses as are either seminaries or colleges.

RECTORY, a parish church, parsonage, or spiritual living, with all its rights, tythes, and glebes.

RECTUM. (*rectum*, from its straight position.) In anatomy. Rectum intestinum. The last portion of the large intestines in the pelvis. See INTESTINES.

RECTUS. (from *rectus*, straight.) In anatomy, a generic name given to various muscles in consequence of their direction.

R. ABDOMINIS. This long and straight muscle is situated near its fellow, at the middle and fore part of the abdomen, parallel to the linea alba, and between the aponeuroses of the other abdominal muscles. It arises sometimes by a single broad tendon from the upper and inner part of the os pubis, but more commonly by two heads, one of which is fleshy, and originates from the upper edge of the pubis, and the other tendinous, from the inside of the symphysis pubis, behind the pyramidalis muscle. From these beginnings, the muscle runs upwards the whole length of the linea alba, and, becoming broader and thinner as it ascends, is inserted by a thin aponeurosis into the edge of the cartilago ensiformis, and into the cartilages of the fifth, sixth, and seventh ribs. This aponeurosis is placed under the pectoral muscle, and sometimes adheres to the fourth rib. The fibres of this muscle are commonly divided by three tendinous intersections, which were first noticed by Berenger, or, as he is commonly called, Carpi, an Italian anatomist, who flourished in the sixteenth century. One of these intersections is usually where the muscle runs over the cartilage of the seventh rib; another is at the umbilicus; and the third is between these two. Sometimes there is one, and even two, between the umbilicus and the pubis. When one or both of these occur, however, they seldom extend more than half way across the muscle. As these intersections seldom penetrate through the whole substance of the muscle, they are all of them most apparent on its anterior surface, where they firmly adhere to the sheath; the adhesions of the rectus to the posterior layer of the internal oblique are only by means of cellular membrane, and of a few vessels which pass from one to another.

Albinus and some others have seen this muscle extending as far as the upper part of the sternum.

The use of the rectus is to compress the fore part of the abdomen, but more particularly the lower part; and, according to the different positions of the body it may likewise serve to bend the trunk forwards, or to raise the pelvis. Its situation between the two layers of the internal oblique, and its adhesions to this sheath, secure it in its place, and prevent it from rising into a prominent form when in action; and lastly, its tendinous intersections enable it to contract at any of the intermediate spaces.

R. ANTERIOR BREVIS. See RECTUS CAPITIS INTERNUS MINOR.

R. ANTERIOR LONGUS. See RECTUS CAPITIS INTERNUS MAJOR.

R. CAPITIS INTERNUS MAJOR. Rectus anterior longus of Winslow. This muscle is situated on the anterior part of the neck, close to the vertebræ. It was known to most of the ancient anatomists, but was not distinguished by any particular name until Cowper gave it the present appellation, and which has been adopted by most writers, except Winslow. It is a long muscle, thicker and broader above than below, where it is thin, and terminates in a point It arises, by distinct flat tendons, from the anterior points of the transverse processes of the five inferior vertebræ of the neck, and, ascending obliquely upwards, is inserted into the anterior part of the cuneiform process of the occipital bone. The use of this muscle is to bend the head forwards.

R. CAPITIS INTERNUS MINOR. Cowper, who was the first accurate describer of this little muscle, gave it the name of rectus internus minor, which has been adopted by Douglas and Albinus. Winslow calls it rectus anterior brevis. It is in part covered by the rectus major. It arises fleshy from the upper and fore part of the body of the first vertebra of the neck, near the origin of its transverse process, and, ascending obliquely inwards, is inserted near the root of the condyloid process of the occipital bone, under the last described muscle. It assists in bending the head forwards.

R. CAPITIS LATERALIS. This muscle seems to have been first described by Fallopius. Winslow calls it transversalis anticus primus. It is somewhat larger than the rectus minor, but resembles it in shape, and is situated immediately behind the internal jugular vein, at its coming out of the cranium. It arises fleshy from the upper and fore part of the transverse process of the vertebra of the neck, and, ascending a little obliquely upwards and outwards, is inserted into the occipital bone, opposite to the stylo-mastoid hole of the os temporis. This muscle serves to pull the head to one side.

R. CAPITIS POSTICUS MAJOR. This, which is the rectus major of Douglas and Winslow, is a small, short, and flat muscle, broader above than below, and is situated, not in a straight direction, as its name would insinuate, but obliquely, between the occiput and the second vertebra of the neck, immediatel under the complexus. It arises, by a short thick tendon, from the upper and posterior part of the spinous process of the second vertebra of the neck; it soon becomes broader, and ascending obliquely outwards, is inserted, by a flat tendon, into the external lateral part of the lower semi-circular ridge of the os occipitis. The use of this muscle is to extend the head, and pull it backwards.

R. CAPITIS POSTICUS MINOR. This is

the rectus minor of Douglas and Winslow. It is smaller than the last described muscle, but resembles it in shape, and is placed close by its fellow, in the space between the recti majores. It arises by a short thick tendon, from the upper and lateral part of a little protuberance in the middle of the back part of the first vertebra of the neck, and, becoming broader and thinner as it ascends, is inserted, by a broad flat tendon, into the occipital bone, immediately under the insertion of the last described muscle. The use of it is to assist the rectus major in drawing the head backwards.

R. EXTERNUS OCULI. Abductor oculi. Indignabundus. The outer straight muscle of the eye. It arises from the bony partition between the foramen opticum and lacerum, being the longest of the straight muscles of the eye, and is inserted into the sclerotic membrane, opposite to the outer canthus of the eye. Its use is to move the eye outwards.

R. FEMORIS. Rectus sive gracilis anterior of Winslow. A straight muscle of the thigh, situated immediately at the fore part. It arises from the os ilium by two tendons. The foremost and shortest of these springs from the outer surface of the inferior and anterior spinous process of the ilium; the posterior tendon, which is thicker and longer than the other, arises from the posterior and outer part of the edge of the cotyloid cavity, and from the adjacent capsular ligament. These two tendons soon unite, and form an aponeurosis, which spreads over the anterior surface of the upper part of the muscle; and through its whole length we observe a middle tendon, towards which its fleshy fibres run on each side in an oblique direction, so that it may be styled a penniform muscle. It is inserted tendinous into the upper edge and anterior surface of the patella, and from thence sends off a thin aponeurosis, which adheres to the superior and lateral part of the tibia. Its use is to extend the leg.

R. INFERIOR OCULI. Depressor oculi. Deprimens. Humilis. The inferior of the straight muscles of the eye. It arises within the socket, from below the optic foramen, and passes forwards to be inserted into the sclerotic membrane of the bulb on the wider part. It pulls the eye downwards.

R. INTERNUS FEMORIS. See GRACILIS.

R. INTERNUS OCULI. Adducens oculi. Bibitorius. The internal straight muscle of the eye. It arises from the inferior part of the foramen opticum, between the obliquus superior, and the rectus inferior, being, from its situation, the shortest muscle of the eye, and is inserted into the sclerotic membrane opposite to the inner angle. Its use is to turn the eye towards the nose.

R. MAJOR CAPITIS. See RECTUS CAPITIS POSTICUS MAJOR.

R. SUPERIOR OCULI. Attollens oculi. Levater oculi. Superbus. The uppermost straight muscle of the eye. It arises from the upper part of the foramen opticum of the sphænoid bone below the levator palpebræ superioris, and runs forward to be inserted into the superior and fore part of the sclerotic membrane by a broad and thin tendon.

RECUBA'TION. *s.* (*recubo*, Latin.) The act of lying or leaning (*Brown*).

RECU'LE, for RECOIL. (*reculer*, French.) (*Spenser*).

RECULVER, a village in Kent, the Regnlbium of the Romans, seated near the mouth of the Thames, 12 miles W. of Margate. It is noted for its church, which was anciently collegiate, but is now in ruins, and has two spires, which serve for a seamark, and are called by mariners, the Two Sisters.

RECU'MBENCY. *s.* (from *recumbent.*) 1. The posture of lying or leaning (*Brown*). 2. Rest; repose (*Locke*).

RECU'MBENT. *a.* (*recumbens*, Lat.) Lying; leaning (*Arbuthnot*).

RECUPERA'TION. *s.* (*recuperatio*, Lat.) The recovery of a thing lost.

To RECU'R. *v. n.* (*recurro*, Latin.) 1. To come back to the thought; to revive in the mind (*Calamy*). 2. (*recourir*, Fr.) To have recourse to; to take refuge in (*Locke*).

To RECU'RE. *v. a.* (*re* and *cure.*) To recover from sickness or labour: not used (*Spenser*).

RECU'RE. *s.* Recovery; remedy (*Knolles*).

RECU'RRENCE. RECU'RRENCY. *s.* (from *recurrent.*) Return (*Brown*).

RECU'RRENT. *a.* (*recurrent*, Fr. *recurrens*, Lat.) Returning from time to time (*Harvey*).

RECURRENT NERVES. Two branches of the par vagum in the cavity of the thorax. The right is given off near the subclavian artery, which it surrounds, and is reflected upwards to the thyroid gland; the left a little lower, and reflected around the aorta to the œsophagus, as far as the larynx. They are both distributed to the muscles of the larynx and pharynx.

RECURRING DECIMALS, those which repeat in the same order, at certain intervals. Thus, the fraction $\frac{2}{3}$ is expressed by the recurring decimal ·66666, &c.; and the fraction $\frac{5}{7}$ by the recurring decimal ·714285714285, &c. The former being reckoned a *simple*, the latter a *compound* recurring decimal. See REPETEND and CIRCULATE.

It is curious that all fractions whose denominator is 7, are expressed in decimals by recurs which have the same effective figures, though varied in their position. Thus,

$\frac{1}{7}$ = ·142857142857, &c.
$\frac{2}{7}$ = ·285714285714, &c.
$\frac{3}{7}$ = ·428571428571, &c.
$\frac{4}{7}$ = ·571428571428, &c.
$\frac{5}{7}$ = ·714285714285, &c.
$\frac{6}{7}$ = ·857142857142, &c.

RECU'RSION. *s.* (*recursus*, Latin.) Return (*Boyle*).

RECURVATE LEAF, in botany, a recurved leaf. Deorsum flexum, ut arcus superiora spectet. Delin. Pl.—Bent, or rather

bowed or curved downwards, so that the bow or convexity is upwards. This term does not occur in Philos. Bot. Berkenhout explains it, but we know not on what authority, "bent downward in a greater degree than reclinate, but not so much as revolute."

When applied to a prickle it is said only to be bent outwards, in opposition to incurvate, bent in. In the same sense it is applied to the awn, petiole, calyx, and corol.

RECURVATION. Recu'rvity. *s.* (*recurvo*, Lat.) Flexure backward (*Brown*).

RECURVIROSTRA. Avocet. In zoology, a genus of the class aves, order grallæ. Bill depressed, subulate, recurved; pointed, flexible at the tip; feet palmate, four-toed, the hind toe not connected, very short, and placed high up; nostrils narrow, pervious; tongue short. Three species.

1. R. avocetta. Scooping avocet. Variegated with white and black. Bill three and a half inches long; irids hazel; crown black; behind and beneath the eyes a white spot; rest of the head, neck, back, exterior part of the wings, lesser quill-feathers, tail and body beneath white; inner scapulars and greater quill-feathers without and at the tips, black; legs blueish, very long; membrane connecting the toes indented. Inhabits southern Europe near the sea; eighteen inches long; feeds on worms and insects, which it scoops from the sand and mud with its bill; eggs two, white tinged with green, and marked with large black spots. This species is, in our own country, a bird of passage; and is seen on our coasts only for a short time, in the months of April and November. It departs often the very day after it arrives; and hence it is very seldom that the sportsman is able to kill it. The avocets are seen most frequently on the east and south shores of Britain, where they reside for a month or two, till frosts begin, and afterwards disappear. It is said that they nestle in some parts of France.

2. R. Americana. American avocet. Head and neck reddish; back black, beneath white. Inhabits North America and New Holland; fourteen inches long.

3. R. alba. White avocet. White; lower wing-coverts brownish; bill orange; legs brown. Inhabits Hudson's Bay: fourteen and a half inches long.

RECU'RVOUS. *a.* (*recurvus*, Latin.) Bent backward (*Denham*).

RECUSANTS, such persons as acknowledge the pope to be the supreme head of the church, and refuse to acknowledge the king's supremacy; who are hence called Popish recusants.

RED, in physics, one of the simple or primary colours of natural bodies, or rather of the rays of light.

The red rays are those which are of all rays the least refrangible: hence, as sir Isaac Newton supposes the different degrees of refrangibility to arise from the different magnitudes of the luminous particles whereof the rays consist, the red rays, or red light, is concluded to be that which consists of the largest particles. See Colour and Light.

Authors distinguish three general kinds of red; one bordering on the blue, as colombine, or dove-colour, purple, and crimson; another bordering on yellow, as flame-colour and orange; and between these extremes is a medium, partaking neither of the one nor the other, which is what we properly call red.

Acids generally turn black, blue, and violet into red; and red into yellow; and yellow into a very pale yellow. Alkalis change red into violet, or purple; and yellow into feuille-mort, or dead leaf-colour.

Terrestrial and sulphureous matters become red by extreme heat; and some at length black, as we see in brick, red bole, red chalk, slate, &c. All these, when vitrified by a burning-glass, become black.

Lobsters become red by a moderate fire; and by a violent one, black. Mercury and sulphur mixed and heated over a moderate fire, make a beautiful red, called artificial cinnabar.

Red, in heraldry. See Gules.

Red bird. See Muscicapa.

Red-breast, in ornithology. See Motacilla.

Red-book of the exchequer, an ancient record or manuscript volume, in the keeping of the king's remembrancer, containing divers miscellany treatises relating to the times before the conquest.

Red-crayon, or Ochre. See Ferrum.

Red-cedar, in botany. See Juniperus.

Red-eye, in ornithology. See Cyprinus.

Red-pole, in ornithology. See Fringilla.

Red-shank, in ornithology. See Scolopax.

Red-wing, in ornithology. See Turdus.

Red-start, in ornithology. See Motacilla.

Red saunders. See Santalum rubrum.

Red Russia. See Russia (Red).

Red Sea, a sea celebrated in holy writ. It extends 1300 miles from N. to S. dividing Africa from Arabia, and is 200 broad, in the widest part. It is separated from the Mediterranean Sea on the N. by the isthmus of Suez, and communicates, by the straits of Babelmandel, on the S. with the Arabian Sea and the Indian Ocean.

REDANS. See Redens.

REDBURN, a village in Herts, five miles NW. of St. Alban's. It formerly belonged to the monastery of St. Alban, and was greatly famed for the pretended relics of Amphibalus, who converted St. Alban to christianity.

RE'DCOAT. *s.* A name of contempt for a soldier (*Dryden*).

To RE'DDEN. *v. a.* (from *red.*) To make red (*Dryden*).

To Re'dden. *v. n.* To grow red (*Pope*).

REDDENDUM, a clause in a lease,

whereby the rent is reserved to the lessor. See DEED.

RE'DDISH. *a.* (from *red.*) Somewhat red.

RE'DDISHNESS. *s.* (from *reddish.*) Tendency to redness (*Boyle*).

REDDI'TION. *s.* (from *reddo*, Latin.) Restitution (*Howel*).

RE'DDITIVE. *a.* (*redditivus*, Lat.) Answering to an interrogative.

REDDLE, red-chalk, in mineralogy, a species of the iron genus: its name bespeaks its colour: it soils strongly, and writes; is easily frangible; adheres strongly to the tongue; feels meagre; specific gravity 3.9. Exposed to a red heat it decrepitates, and becomes black; it may even be melted into a greenish grey spumous enamel. In Silesia it is found in compact limestone: it is principally used for drawing; the coarser kinds are used by the carpenter, the finer by the painter. It is sometimes used in its natural state, and sometimes pulverized, washed, and mixed with gum, and cast into moulds.

REDE (William), bishop of Chichester, in the year 1369, and the best mathematician of his time. He built the first library of Merton college, and the castle of Ambarley.

REDE. *s.* (ræban, Saxon.) Counsel; advice (*Shakspeare*).

To REDE. *v. a.* (ræban, Saxon.) To advise (*Spenser*).

To REDEE'M. *v. a.* (*redimo*, Latin.) 1. To ransome; to relieve from forfeiture or captivity by paying a price (*Ruth*). 2. To rescue; to recover (*Shakspeare*). 3. To recompense; to compensate; to make amends for (*Dryden*). 4. To free by paying an atonement (*Shakspeare*). 5. To pay the penalty of (*Milton*).

REDEE'MABLE. *a.* (from *redeem.*) Capable of redemption.

REDEE'MABLENESS. *s.* (from *redeemable.*) The state of being redeemable.

REDEE'MER. *s.* (from *redeem.*) 1. One who ransoms or redeems (*Spenser*). 2. The Saviour of the world (*Shakspeare*).

To REDELI'VER. *v. a.* (*re* and *deliver.*) To deliver back (*Ayliffe*).

REDELI'VERY. *s.* (from *redeliver.*) The act of delivering back.

To REDEMA'ND. *v. a.* (*redemander*, Fr.) To demand back (*Addison*).

REDE'MPTION. *s.* (*redemption*, Fr.) 1. Ransome; release (*Milton*). 2. Purchase of God's favour by the death of Christ (*Shakspeare*).

REDE'MPTORY. *a.* (from *redemptus*, Lat.) Paid for ransome (*Chapman*).

REDENS, REDANS, or REDANT, in fortification, a kind of work indented in form of the teeth of a saw, with saliant and re-entering angles; to the end that one part may flank or defend another.

It is also called saw work, and indented work. The faces in this flank one another.

Redens are frequently used in the fortifying of walls, where it is not necessary to be at the expence of building bastions; as when they stand on the side of a river, a marsh, the sea, &c. But the fault of such fortification is, that the besiegers from one battery may ruin both the sides of the tenaille or front of a place, and make an assault without fear of being enfiladed, since the defences are mined.

The parapet of the corridor also is frequently redented, or carried on by the way of redens.

RED GUM, in medicine. See STROPHULUS.

RED HOT, heated to redness.

REDHEAD, a promontory in Angusshire, on the German Ocean, lying S. of Montrose. Here are the ruins of a castle, almost surrounded by the sea. Till the year 1793, this cape was the point beyond which coal was not permitted to pass without paying a heavy duty, which was taken off by a commutation duty on spirits.

REDI (Francis), an Italian physician, born at Arezzo, in Tuscany, 1662. He was admitted doctor in medicine, and professor of philosophy at Pisa, and the grand duke Ferdinand II. appointed him his physician. He contributed towards compiling the La Crusca dictionary, and Menage, in his Origine de la langue Italianne, and other authors, consider his language so pure as to be considered the standard of perfection. He died in 1697.

REDI (Tomaso), an Italian painter, born at Florence in 1665, and died in 1726. Several historical pictures by him adorn the churches in Tuscany, and he had also an excellent style of painting portraits.

REDITTA. (Italian.) In music, the same as *repeat*, *replica*, *replicato*, and *represa*; all which signify that we are to repeat the strain or movement over which it is written.

REDICULUS, a deity whose name is derived from the word *redire*, to return. The Romans raised a temple to this imaginary deity on the spot where Annibal had retired when he approached Rome, as if to besiege it.

REDI'NTEGRATE. *a.* (*redintegratus*, Latin.) Restored; renewed; made new (*Bacon*).

REDINTEGRA'TION. *s.* (from *redintegrate.*) 1. Renovation; restoration (*Decay of Piety*). 2. *Redintegration* was formerly much used by chemists to denote the restoring any mixed body or matter, whose form has been destroyed, to its former nature and constitution.

RE'DNESS. *s.* (from *red.*) The quality of being red (*Shakspeare*).

RE'DOLENCE. RE'DOLENCY. *s.* (from *redolent.*) Sweet scent (*Boyle*).

RE'DOLENT. *a.* (*redolens*, Latin.) Sweet of scent (*Sandys*).

REDON, a town of France, in the department of Isle and Vilaine. It serves as a mart for the commerce of Rennes, and is seated on the Vilaine, 20 miles E. of Vannes, and 225 E. by S. of Paris. Lon. 2. 10 W. Lat. 37. 48 N.

REDONDELLA, a commercial town of Spain, in Galicia, with a castle. It was pillaged by the English in 1702. There is a fishery for anchovies on the coast. It is seated

at the bottom of a bay of the Atlantic, eight miles S. of Ponte Vedra. Lon. 8. 15 W. Lat. 42. 18 N.

REDONDO, a town of Portugal, in Beira, with a castle. It has a manufacture of cloth, and is seated at the mouth of the Mondego, 17 miles S.W. of Coimbra. Lon. 8. 34 W. Lat. 40. 4 N.

To REDOU'BLE. *v. a.* (*redoubler*, Fr.) 1. To repeat in return (*Spenser*). 2. To repeat often (*Shakspeare*). 3. To increase by addition of the same quantity over and over (*Addison*).

To REDOU'BLE. *v. n.* To become twice as much (*Addison*).

REDOUBLED. An epithet applied to any simple interval carried into its octave: as the thirteenth, composed of a sixth and octave, is a redoubled sixth; and the fifteenth, containing two octaves, is a redoubled octave. To find the simple of any redoubled interval, we must throw out seven as often as the compound will admit, and the remainder will be the name of the simple interval: as seven thrown out from thirteen leaves the simple interval of a sixth; and twice seven taken from fifteen leaves that of a second.

REDOUBT, in fortification, a small square fort, without any defence but in front; used in trenches, lines of circumvallation, contravallation, and approach; as also for the lodgings of the corps-de-gard, and to defend passages.

REDOU'BTABLE. *a.* (*redoubtable*, Fr.) Formidable; terrible to foes (*Pope*).

REDOU'BTED. *a.* (*redoubté*, French.) Dread; awful; formidable: not in use (*Spenser*).

To REDOU'ND. *v. n.* (*redundo*, Latin.) 1. To be sent back by reaction (*Milton*). 2. To conduce in the consequence (*Addison*). 3. To proceed in the consequence (*Addison*).

To REDRE'SS. *v. a.* (*redresser*, French.) 1. To set right; to amend (*Milton*). 2. To relieve; to remedy; to ease (*Sidney*).

REDRE'SS. *s.* (from the verb.) 1. Reformation; amendment (*Hooker*). 2. Relief; remedy (*Bacon*). 3. One who gives relief (*Dryden*).

REDRE'SSIVE. *a.* (from *redress.*) Succouring; affording remedy (*Thomson*).

REDRUTH, a town in Cornwall, whose market is disused. It is seated in the very heart of the mining country, 12 miles N.N.E. of Helstone, and 262 W. by S. of London. Lon. 5. 13 W. Lat. 50. 13 N.

To REDU'CE. *v. a.* (*reduco*, Latin.) 1. To bring back: obsolete (*Shakspeare*). 2. To bring to the former state (*Milton*). 3. To reform from any disorder (*Clarendon*). 4. To bring into any state of diminution (*Boyle*). 5. To degrade; to impair in dignity (*Tillotson*). 6. To bring into any state of misery or meanness (*Arbuthnot*). 7. To subdue (*Milton*). 8. To bring into any state more within reach or power. 9. To reclaim to order (*Milton*). 10. To subject to a rule; to bring into a class.

REDU'CEMENT. *s.* The act of bringing back, subduing, reforming, or diminishing (*Bacon*).

REDU'CER. *s.* (from *reduce.*) One that reduces (*Sidney*).

REDU'CIBLE. *a.* (from *reduce.*) Possible to be reduced (*South*).

REDU'CIBLENESS. *s.* (from *reducible.*) Quality of being reducible (*Boyle*).

REDU'CTION. *s.* (*reduction*, Fr.) The act of reducing (*Hale*).

REDUCTION, in the schools, a manner of bringing a term or proposition, which was before opposite to some other, to be equivalent to it.

REDUCTION, in arithmetic, that rule whereby numbers of different denominations are brought into one denomination. See ARITHMETIC.

REDUCTION OF EQUATIONS, in algebra, is the clearing them from all superfluous quantities, bringing them to their lowest terms, and separating the known from the unknown, till at length only the unknown quantity is found on one side, and known ones on the other. The reduction of an equation is the last part of the resolution of the problem. See ALGEBRA.

REDUCTION OF A FIGURE, DESIGN, OR DRAUGHT, is the making a copy thereof, either larger or smaller than the original; still preserving the form and proportion. The great use of the proportional compasses is the reduction of figures, &c. whence they are called compasses of reduction. There are various methods of reducing figures, the most easy is by means of the pentagraph, or parallelogram; but this has its defects. See PENTAGRAPH.

REDUCTION, in metallurgy, a restoration of metallic substances which have been changed to scoriæ or oxyds, to their reguline state or that of pure metals, exhibiting the lustre which is so eminently characteristic of them when perfect. Reduction is for the most part effected by charcoal, in consequence of the close affinity of its carbon for oxygen, a high temperature being at the same time had recourse to, either with or without the assistance of fluxes. For the various modes of reduction in actual practice, see the articles of the different metals.

All metals, even the few that resist the action of heat and air, undergo a similar change when exposed to acids, especially the sulphuric, the nitric, and the muriatic, or a mixture of the two last. All metals, by these means, may be converted into powders, which have no resemblance to the metals from which they were obtained. These powders were formerly called calces; but at present they are better known by the name of oxyds. They are of various colours, according to the metal and the treatment, and are frequently manufactured in large quantities to serve as paints. When these oxyds are mixed with charcoal powder and heated in a crucible, they lose their earthy appearance, and are changed again into the metals from which they were produced. Oil, tallow, hydrogen gass, and other combustible bodies, may be often substituted for charcoal. By this operation, which is called the reduction

of the oxyds, the combustible is diminished, and indeed undergoes the very same change as when it is burnt. In the language of Stahl, it loses its phlogiston; and this induced him to conclude that metals are composed of earth and phlogiston. Mr. (now sir Humphrey) Davy, as we have seen in other parts of this work, inclines to the opinion that there are only two principles in nature, an inflammable and metallic principle.

REDUCTION, in surgery, denotes an operation whereby a dislocated, luxated, or fractured bone, is restored to former its state or place.

REDU'CTIVE. *a.* (*reductif*, Fr.) Having the power of reducing (*Hale*).

REDU'CTIVELY. *ad.* By reduction; by consequence (*Hammond*).

REDU'NDANCE. REDU'NDANCY. *s.* (*redundantia*, Latin.) Superfluity; superabundance; exuberance (*Bacon*).

REDU'NDANT. *a.* (*redundans*, Latin.) 1. Superabundant; exuberant; superfluous (*Ar.*). 2. Using more words or images than are useful (*Watts*).

REDUNDANT HYPERBOLA, is a curve of the higher kind, called redundant because it exceeds the conic hyperbola in the number of legs; being a triple hyperbola, with six hyperbolic legs.

REDU'NDANTLY. *ad.* (from *redundant.*) Superfluously; superabundantly.

To REDU'PLICATE. *v. a.* (*re* and *duplicate.*) To double.

REDUPLICA'TION. *s.* (from *reduplicate.*) The act of doubling (*Digby*).

REDU'PLICATIVE. *a.* (*reduplicatif*, Fr.) Double (*Watts*).

REDUTTIONE. See DEDUTTIONE.

REDUVIUS. In the entomology of Fabricius, a tribe of the genus CIMEX, which see.

To REE. *v. a.* To riddle; to sift (*Mortimer*).

To REE'CHO. *v. n.* (*re* and *echo.*) To echo back (*Pope*).

REE'CHY. *a.* (from *reck.*) Smoky; sooty; tanned (*Shakspeare*).

REED (Bamboo), in botany. See ARUNDO.

REED (Common), in botany. See ARUNDO.

REED (Spanish or Portugal), in botany. See ARUNDO.

REED (Indian flowering), in botany. See CANNA.

REED, in music, the little moveable tube through which a hautboy, bassoon, or clarinet, is blown. Also the name given by organ-builders to a kind of tongue, consisting of a thin narrow plate of brass, and which being fixed to one end of an organ pipe, is put into a vibratory motion by the action of the wind, and produces a reedy thickness of tone. Those stops of an organ which consist of pipes so furnished are called reed stops.

REE'DEN. *a.* (from *reed.*) Consisting of reeds (*Dryden*).

To REE'DIFY. *v. a.* (*reedifier*, Fr.) To rebuild; to build again (*Shakspeare*).

REE'DLESS. *a.* (from *reed.*) Being without reeds (*May*).

REE'DY. *a.* (from *reed.*) Abounding with reeds (*Blackmore*).

REEK. *s.* (рec, Saxon.) 1. Smoke; steam; vapour (*Shakspeare*). 2. (*reke*, Germ. any thing piled up.) A pile of corn or hay, commonly pronounced *rick*.

To REEK. *v. n.* (рecan, Saxon.) To smoke; to steam; to emit vapour (*Shakspeare*).

REE'KY. *a.* (from *reck.*) Smoky; tanned; black (*Shakspeare*).

REEL. *s.* (рeol, Sax.) A turning frame, upon which yarn is wound into skains from the spindle.

To REEL. *v. a.* (from the noun.) To gather yarn off the spindle (*Wilkins*).

To REEL. *v. n.* (*rollen*, Dutch; *ragla*, Swed.) To stagger; to incline in walking, first to one side and then to the other (*Sandys*).

REELE'CTION. *s.* (*re* and *election.*) Repeated election (*Swift*).

To REENA'CT. *v. n.* (*re* and *enact.*) To enact anew (*Arbuthnot*).

To REENFO'RCE. *v. a.* (*re* and *enforce.*) To strengthen with new assistance (*Collier*).

REENFO'RCEMENT. *s.* (*re* and *enforcement.*) 1. Fresh assistance; new help (*Milton*). 2. Iterated enforcement (*Ward*).

To REENJO'Y. *v. a.* (*re* and *enjoy.*) To enjoy anew or a second time (*Pope*).

To REE'NTER. *v. a.* (*re* and *enter.*) To enter again; to enter anew (*Milton*).

To REENTHRO'NE. *v. a.* To replace in a throne (*Southern*).

REE'NTRANCE. *s.* (*re* and *entrance.*) The act of entering again (*Glanville*).

REE'RMOUSE. *s.* (hрeremur, Saxon.) A bat.

To REESTA'BLISH. *v. a.* (*re* and *establish.*) To establish anew (*Smalridge*).

REESTA'BLISHER. *s.* (from *reestablish.*) One that reestablishes.

REESTA'BLISHMENT. *s.* (from *reestablish.*) The act of reestablishing; the state of being reestablished; restauration (*Addison*).

REEVE. *s.* (зeneрa, Saxon.) A steward (*Dryden*).

REEVING, in the sea language, the putting a rope through a block. Hence the pulling a rope out of a block is called unreeving.

To REEXA'MINE. *v. a.* (*re* and *examine.*) To examine anew (*Hooker*).

To REFE'CT. *v. a.* (*refectus*, Latin.) To refresh; to restore after hunger or fatigue (*Brown*).

REFE'CTION. *s.* (*refectio*, Lat.) Refreshment after hunger or fatigue (*South*).

REFE'CTORY. *s.* (*refectoire*, Fr.) Room of refreshment; eating room (*Dryden*).

To REFE'L. *v. a.* (*refello*, Lat.) To refute; to repress (*Ben Jonson*).

To REFE'R. *v. a.* (*refero*, Latin.) 1. To dismiss for information or judgment (*Burnet*). 2. To betake to for decision (*Shakspeare*). 3. To reduce to, as the ultimate end (*Bacon*). 4. To reduce, as to a class (*Boyle*).

To REFE'R. *v. n.* 1. To respect; to have relation (*Burnet*). 2. To appeal (*Bacon*).

REFEREE'. *s.* (from *refer.*) One to whom any thing is referred (*L'Estrange*).

RE'FERENCE. *s.* (from *refer.*) 1. Relation; respect; view toward; allusion to (*Raleigh*). 2. Dismission to another tribunal (*Swift*).

REFERE'NDARY. *s.* (*referendus*, Latin.) One to whose decision any thing is referred (*Bacon*).

To REFERME'NT. *v. a.* (*re* and *ferment.*) To ferment anew (*Blackmore*).

REFE'RRIBLE. *a.* (from *refer.*) Capable of being considered, as in relation to something else (*Brown*).

To REFI'NE. *v. a.* (*raffiner*, French.) 1. To purify; to clear from dross and recrement (*Zechariah*). 2. To make elegant; to polish.

To REFI'NE. *v. n.* 1. To improve in point of accuracy or delicacy (*Dryden*). 2. To grow pure (*Addison*). 3. To affect nicety (*Atterbury*).

REFI'NEDLY. *ad.* (from *refine.*) With affected elegance (*Dryden*).

REFI'NEMENT. *s.* (from *refine.*) 1. The act of purifying, by clearing any thing from dross and recrement (*Norris*). 2. Improvement in elegance or purity (*Swift*). 3. Artificial practice (*Rogers*). 4. Affectation of elegant improvement (*Addison*).

REFI'NER. *s.* (from *refine.*) 1. Purifier; one who clears from dross or recrement (*Bac.*). 2. Improver in elegance (*Swift*). 3. Inventor of superfluous subtilties (*Addison*).

REFINING, in metallurgy, is a branch of the general process of assaying metals: see the article ASSAY. In a more limited sense it is more frequently applied to the precious metals, as gold and silver, both of which may be refined by various methods which are founded on their essential properties, and acquire different names according to their kinds. Thus for instance, gold having the property which no other metal, not even silver, possesses, of resisting the action of sulphur, of antimony, of nitrous acid, of marine acid, may be purified by these agents from all other metallic substances, and consequently may be refined by them. These operations are distinguished by proper names, as purification of gold by antimony, parting, concentrated parting, dry parting. In a similar manner, as silver has the property, which the imperfect metals have not, of resisting the action of nitre, it may be refined by this salt. The term refining, however, is chiefly applied to the purification of gold or silver by the use of lead in the cupel. This effect is obtained by the destruction, vitrification, or scorification of all the extraneous and destructible metallic substances with which they are alloyed.

As none but the perfect metals can resist the combined action of air and fire without losing their inflammable principle, and being changed into earthy or vitreous matters incapable of remaining any longer united with substances in a metallic state, there is then a possibility of purifying gold and silver from all alloy of imperfect metals merely by the action of fire and air, and only keeping them fused till the alloy is destroyed; but this purification would be exceedingly tedious, and highly expensive from the great quantity of fuel that must necessarily be consumed. Silver alloyed with copper has been exposed more than sixty hours to a glass-house fire without being perfectly refined: the reason of which is that when a small quantity only of imperfect metal remains united with gold or silver it is covered and protected from the action of the air, which is necessary for the combustion of the imperfect metals, as of all other combustible materials.

The refining of gold and silver merely by the action of fire, which was the only method formerly known, was therefore very long, difficult, expensive, and imperfect; but a much shorter and more advantageous method has been discovered in modern times. This consists in adding to the alloyed gold and silver a certain quantity of lead, and afterwards exposing this mixture to the action of fire. Lead is one of the metals which loses most quickly and easily a sufficient quantity of its inflammable principle to cease to be in a metallic state; but at the same time this metal has the remarkable property of retaining, notwithstanding the action of fire, enough of this same inflammable principle to be very easily melted into a vitrified and powerfully vitrifying matter, called litharge.

The lead then which is to be added to the gold and silver to be refined, or which happens naturally to be mixed with these metals, produces in their refining, the following advantages. 1. By increasing the proportion of imperfect metals it prevents them from being so well covered and protected by the perfect metal. 2. By uniting with these imperfect metals it communicates to them its own property of losing very easily a great part of its inflammable principle. 3. By its vitrifying and fusing power which it exercises with all its force upon the calcined, and naturally refracting parts of the other metals, it facilitates and accelerates the fusion, scorification, and separation of these metals.

The lead which in the operation is scorified, and scorifies along with it the imperfect metals, separates from the metallic mass, with which it is then incapable of remaining united: it floats upon the surface, because by losing a part of its phlogiston, or at least some imperceptible constituent material, it loses also part of its specific gravity, and lastly it vitrifies.

These vitrifying and matted matters accumulating more and more upon the surface of the metal while the operation advances, would protect this surface from the contact of air which is so absolutely necessary for the scorification of the rest, and would thus stop the progress of the operation, which could never be finished if a method had not been contrived for their removal. This method consists either in the nature of the vessel in which the melted matter is contained, and which, being porous,

absorbs and imbibes the scorified matter as fast as it is formed; or in a channel cut in the edge of the vessel through which the matter flows out.

The refining vessel is flat and shallow, that the greatest surface of the material may be exposed to the action of the air: in its form it resembles a cup, and has hence been called a cupel. The furnace ought to be vaulted, that the heat may be applied upon the surface of the metal during the whole time of the operation. Upon this surface a crust of dark-coloured pellicle is continually forming. In the instant when all the imperfect metal is destroyed, and consequently the scorification ceases, the surface of the perfect metal is seen, and appears clean and brilliant. This forms a kind of fulguration or corruscation, by which mark the metal is well known to be refined. If the operation be so conducted that the metal sustains only the precise degree of heat necessary to keep it fused before it is perfectly refined we may observe that it fixes or becomes solid all at once in the very instant of the corruscation; because a greater heat is required to keep silver or gold in fusion when they are pure than when they are alloyed with lead.

The operation of refining may be performed in large or in small quantities upon the same principles, but only with some differences in the management. As the refining of small quantities of perfect metals in the same manner as these metals are assayed, the assay being only a very accurate mode of the refining, we again refer the reader to the article ASSAY for additional information.

The art of assaying, observes M. Fabbroni of Florence, was known in the remotest times, as the Scriptures attest. In the time of Pliny is had reached such perfection, that the fineness of gold to which the art was chiefly applied, was ascertained from 21 carats, or 0·875, to 21 carats and 7 twenty-fourths, 0·888, and even to 23 carats and 11 thirty-seconds, 0·973. In those days the assay must have been made in the dry way; first by separating the base metals from the gold by means of lead, and afterwards the silver by means of sulphur or a sulphuret.

The method of refining gold in large quantities was also known, as Strabo says, by cementing or burning it with an argillaceous earth, which, destroying the silver, left the gold in a state of purity. Pliny says, that for this purpose the gold was placed on the fire in an earthen vessel with three times its weight of salt; and that it was afterward exposed anew to the fire with two parts of salt, and one of schist, certainly argillaceous. This would certainly effect the decomposition of the salt, and the volatilization of the muriatic acid in a state of ignition and dry, which would penetrate the substance of the gold, and separate the silver in the form of a volatile muriate; the object and effect of the cementation of the moderns. But Agatharchides has transmitted to us an account of a peculiar method practised in the mines situate between the Nile and the borders of the Red Sea, in which we perceive the well known property of the muriatic acid in separating silver.

This author says, if he express himself accurately, and there be no corruption of the text, that the gold there is enclosed in marble: that the miners burn or calcine this ore: that they break it with hammers, pound, grind, and wash it: and that lastly the gold, placed in a covered crucible with a little lead, some salt, a little tin, and some barley-meal, was exposed to the fire five days.

The mintmen of Darius certainly employed this or a similar method, when this enlightened king was desirous of giving his subjects the noble and useful example of money made with the purest gold, similar to that of fine silver made afterward by his satrap Ariander.

It is not easy, however, to give a plausible explanation of the rationale of the docimastic method transmitted to us by Agatharchides. But if the operation he describes were intended not as a cementation, but a real and prolonged fusion, it remains to be explained, how the employment of a closed crucible, kept on the fire as he directs, is to be reconciled with the object proposed; nor is it easy to comprehend the use of barley-meal.

But on reflecting on the ingenious method, which Hellot found practised at Lyons, for refining, purifying, and separating cupelled silver from the little lead that remains with it after the first refining, we may form some notion of it.

The practice in that city was to take a crucible thirteen inches high, and five inches wide at the mouth: to put a layer of small charcoal three inches deep at the bottom, and cover it with a triangular piece of a crucible, fastened by a little lute at each corner, its sides answering to the corners of the crucible; and on this false bottom to place sixty or sixty-five pounds of silver in long slender ingots, to be melted and purified. The wind-furnace used for this purpose was fourteen inches high, seven in diameter at the grate, and nine at the top. The metal, as it melted, was observed to sink to three inches below the edges of the crucible; and then, when it had acquired a sufficient degree of heat, it was seen to boil like water exposed to a strong fire. In this state it was kept seven or eight hours.

The elastic fluid, which in this case was evolved from the charcoal beneath, caused the agitation here mentioned; the charcoal constituting, as we may say, a kind of bellows ingeniously placed at the bottom of the crucible.

Charcoal, placed in close vessels of glass or metal, we know is not altered, though heated red-hot. This we are taught by theory, and the truth is confirmed by many experiments. But the observation reported by the judicious Hellot equally attests, that in this case the charcoal beneath the melted silver is decomposed, and continues to furnish elastic fluid; since this learned chemist found, that silver kept in the same degree of heat, without any charcoal beneath, has a tremulous motion at its surface,

and proceeds from the centre to the sides and back again, but does not boil with such noise: whence then comes the elastic fluid?

Priestley, the founder of modern pneumatic chemistry by an immense number of facts, demonstrates in the most evident manner, what has since been confirmed by many other experiments, that earthen vessels, heated to such a degree as to give a passage to light, are filters, or rather sieves, giving admission even to the external air. Thus caloric and light penetrating the bottom of the crucible, and with them the air, attracted chemically by the charcoal within its oxygen, coming into contact with the incandescent charcoal, inflames a portion of it, combines with it and caloric, and forms carbonic acid. This elastic fluid, through the uninterrupted action of the fire, acquires sufficient force to overcome the pressure of a column of seven inches of liquid silver above it, and passes through it, agitating it violently. The small residue of lead, which was combined and diffused throughout the mass, being brought by the continual agitation into contact with the carbonic acid gass and the atmosphere (the latter, and perhaps the former, being decomposed by a superior affinity from the concurrence of circumstances), is oxyded, and, from the dimunition of its specific gravity, is compelled to occupy the upper surface.

In fact, Hellot observed a kind of yellowish oil rise from the interior of the melted silver, and float on it. This oil was a pure oxyd of lead in fusion; formed by the contact of the continually renewed atmospheric air. The refiners collect this melted oxyd, by enveloping and absorbing it with glass or a meagre earth; this earth being removed more readily from the silver it covers, and then the metal remains pure and limpid.

If we refer to this method the process of Agatharchides reported above, though very imperfectly, we may suppose, that the barley, or its meal, was employed instead of charcoal, to form what the Lyonese call the soul of the crucible; that it was placed at the bottom of the crucible, and retained there by a cover (whence probably the expression of a closed crucible); and that on this was poured the gold fused with a little lead, to vitrify the base metals it might contain, and common salt, and sulphuret of antimony or of lead, to seize the fine silver, and volatilize it with the lead, or reduce it to scoriæ. The elastic fluids evolved from the vegetable matter by the action of the fire would perform the office of bellows, to agitate the metal violently and incessantly for several days, which would occasion all the impurities to float on the surface, where they would be scummed off, as is done by the Lyonese.

But, to say the truth, a fire continued for five days gives rather an idea of the cementation of the moderns, analogous to that transmitted to us by Pliny, than of a real fusion in closed crucibles; a circumstance directly opposite to the purpose intended. Thus in Hungary, the better to open all the interior parts of the gold to the muriatic acid reduced to vapour in the process of cementation, it is customary to add lead to the mass, which is afterward reduced into small hollow drops, or grains as they are called. It is possible, that the lead mentioned by Agatharchides was intended for the same purpose; that tin is a mistaken expression for crude antimony, or native sulphuret of lead; and that the barley meal was intended merely to promote the uniform distribution of the little salt, a stratum of which was to be placed on the gold, and assisted perhaps in decomposing it, as clay or sulphate of iron does now.

To obtain some light on this curious subject, into a crucible, covered by another inverted over it, were put 720 grs of barley meal, and 576 grs of common salt. This mixture was heated till it acquired the colour of a redhot coal, and in this state it was kept for six and thirty hours. More from curiosity than to derive any important conclusion from it, into it had been put a small slip of gold, at 21 carats 3 eighths, or 0·891, a third of a millimeter (about 0·13 of a line Eng.) thick, and weighing 24 grs; and a slip of silver, at 11 dwts and half, or 0·958, half a millimeter (near 0·2 of a line) thick, and weighing 40 grs. The lower crucible, in which these were placed, was half full; and in the luting of that above was left an opening of 5 mil. (near 2 lines) for the issue of the elastic vapour.

At the expiration of this time the apparatus, after being cooled, was opened. In it was found a very little earthy residuum, slightly saline, whitish, weighing scarcely 11·5 grs. The gold was above it, and increased in weight an eighth of a grain, being perceptibly whitened by the fusion of some very small particles of silver, separated from the remains of the little slip of that metal, which was found sticking upon the gold in the form of an agglutinated dust possessing very little adhesion. These remains were pure silver, and weighed 6 grs and an eighth. The gold, which was silvered only on its surface, was boiled some time in pure nitric acid; when it lost entirely its silvery hue, and was found, on assaying it, to be of 24 carats.

The little earthy residuum was then examined. In it were found no saline particles but a few atoms of muriate of soda, and barely a trace of muriate of copper. The muriate of silver, which from the loss of the metal must have weighed 45·5 grs, had certainly evaporated with the other elastic vapours. In the formation of this muriate only 11·5 grs of muriatic acid had been employed. The 324 grs of acid beside, contained in the salt employed, were dissipated (leaving the small portion of copper out of the question) by a decomposition effected through the means of the vegetable matter mixed with it. But what is difficult to account for, and is foreign to our purpose, is the entire evaporation of 240 grs of soda, which the common salt contained, and which should have remained fixed at the bottom of the crucible. This must have been rendered volatile either by decomposition,

or by forming a new compound, and escaped through the opening in the apparatus.

It is not probable therefore, that Philip employed similar methods of refining, either by fusion or by cementation, because he would have reduced the gold to a state of perfect purity, as Darius thought proper to do subsequently; or he would not have confined himself to so small a portion of alloy, or perhaps that alloy would not have been silver. And if he employed the gold as he found it, we must necessarily infer, that nature yields gold at 23 carats and half, or 0·979 (7).

Many perhaps will doubt, whether gold be found in nature so near to perfect purity; though Strabo says, that gold was found pure in the Noric Alps; while Pliny is quoted for the assertion, that none is found free from silver. But, without being left in suspense by the assertions and opinions of others, I have the means of removing all doubt on the question; having had an opportunity of ascertaining by my own examination, that gold is actually found native at 24 carats.

I had for some time the keeping of the rich collection of natural history belonging to our first king, who was very fond of these things, and eminently versed in natural philosophy.

In it were many specimens of mineralized gold and native gold, among which I observed two well-formed crystals of gold; one cubical, the other a tetraedral prism surmounted by a four-sided pyramid. It would be gratifying to know what substances united to the gold determined these different figures, naturally formed in the bowels of the earth, and altogether different from those produced in our laboratories by cooling after fusion. The cube is very pale; the prism is of a deeper colour; but these two crystals, which I found by chance in selecting a great many native grains, are unique in the collection, so that it is impossible to think of subjecting them to an examination that would spoil their figure.

An amorphous but remarkable specimen from Brazil enriched the same collection. It was given by the prince of Brazil, at Badajoz, to the late king of Etruria, then infant of Spain and hereditary prince of Parma. The weight of this piece is about 14 lbs. (12 lbs. 9 oz. troy), beside a small fragment of the same, the nature of which, through the kindness of the king's apothecary, John Ulrici, I was enabled to examine by cupellation and parting; without neglecting to test its solution in nitromuriatic acid by sulphate of iron, and neutral salts with base of potash. By all these trials I was convinced that it is very pure gold of 24 carats, if the whole mass be homogeneous, without any portion of inferior metal.

As no person has ever doubted that very coarse gold is found in minerals containing it, I am now certain, that nature likewise presents us with it of the greatest fineness, and even perfectly pure. This is what I purposed to show by this new fact, in writing this little essay, as a present to the lovers of mineralogy and antiquities.

Notes on the preceding paper by Mr. D'Arcet, verifier of assays at the mint of France.

(1) Pliny says, book 33, that there is no gold more pure than that obtained from the sands of rivers; and that all gold obtained by arrugiæ has no occasion to be melted, being pure native gold. But Pliny says in the same book, that lead is more malleable and heavier than gold, which is a mistake, and proves, that the gold considered by Pliny as pure was an alloy. He says also farther on, that all gold is mixed with silver; and that the freest from silver known is the gold of Albicrare in Gaul, which contained but a thirty-sixth: whence it follows, that the testimony of Pliny to this point is of no weight, and that we must appeal to experiment.

(2) I delivered to Mr. Mongez the analysis of an ancient coin with the effigies of Philip, which proves, that in his reign coins were made of alloys, the composition of which was native, or at least unknown; for this piece contained

Silver	368
Gold	184
Copper	448
	1000.

It is not probable, that the regulations of the mint required such or so complex an alloy, at a time when the methods of analysis or assay were but approximations; and when they were unquestionably far from the accuracy that may be obtained even by employing only the touchstone, touchneedles, and prepared acid, used at present.

(3) The art of assaying was as far as possible from perfect in those remote periods. Under the emperors even the fineness of gold and of silver was judged by the colour it took in the fire, and that of its streak on the touchstone.

These methods, though practised by experienced men, can give only very inaccurate results, and which may be varied by a number of circumstances; as strong cleaning by aqua fortis, a complication in the alloy, a difference in the alloy, &c.

Archimedes would not have applied the laws of specific gravity to ascertain the falsification of the crown of Hiero, if he could have done it by a better method, and particularly by a method known and commonly practised.

It is well known too, that, under the triumvirate of Mark Antony, every street in Rome erected a statue to Marius Gratianus, who had invented and introduced one of these approximate methods, that have been mentioned; and this denotes the infancy of a useful art, the first steps of which are highly encouraged, because they are considered as conducive to the public welfare.

(4) By employing alkaline sulphurets the solution of gold may be effected: metallic sulphurets only must be understood here.

(5) Mr. de Robilant, in his account of the processes employed in the mint of Turin, says, that cementation is the process of refining commonly employed at Venice, Genoa, and Florence, where zechins are coined of nearly pure gold.

(6) As Mr. Fabbroni says, it is not easy to explain the grounds of the process described by Agatharchides, or of that which appears to be still practised at Lyons. These processes should be repeated, attending to their progress with care, and applying to them the means of modern chemical analysis, particularly the pneumatochemical apparatus. The nature of the gass that traverses the fluid silver should be ascertained, why it forms under such a pressure, why it does not flow back through the pores of the crucible, &c.

The experiment related by Mr. Fabbroni does not appear to me sufficiently conclusive, to decide the question.

(7) Reaumur says, Mémoires de l'Ac. des Sciences, An. 1718, p. 87, that

The gold of the river Cèze is at 18 car. 8 grs

Rhone - - 20
Rhine - - - 21·52
Arriège - - 22.25.

He farther observes, that the fineness varies in the same piece of native gold. He says, that the piece of 56 marks, which was seen at the academy, was in one place 23 carats and a half, in another 23 carats, and in another 22. The piece of 63 marks belonging to father Feuillée was at its upper part 52 carats 2 grs; a little lower, 21 carats, ½ gr.; and at two inches from the bottom only 17 carats and half. (Reaumur's grain is a twelfth of a carat, a division used in Germany.)

Mr. G. A. Deluc announced in the Journal de Physique, vol. lii. p. 205, that pieces of gold, found in the county of Wicklow, in Ireland, contained a ninth of their weight of silver, without any other alloy.

"My father," says Mr. Fabbroni, "having been appointed to assay the piece of native gold belonging to the academy, during the time of the revolution, made two assays of it, both of which were 23 car. 26 thirty-seconds. This comes very near to pure gold; and proves, that gold is found in nature alloyed with very variable quantities of silver."

Mr. Fabbroni is the first who has demonstrated, that gold is found also quite pure. This is an important observation; but it does not seem to overturn the general principle, that native gold is a natural alloy of gold and silver: a principle established by a great number of facts, and to which only one exception is yet known.

It is desirable, that the presence of lead should be sought for in ancient coins or medals: as this would be the most certain method of ascertaining, whether the ancients refined their gold, or employed it as nature gave it them.

To REFIT. *v. a.* (*refait*, Fr. *re* and *fit.*) To repair; to restore after damage (*Woodward*).

To REFLE'CT. *v. n.* (*reflechir*, French; *reflecto*, Latin.) To throw back (*Milton*).

To REFLE'CT. *v. n.* 1. To throw back light (*Shakspeare*). 2. To bend back (*Bent.*). 3. To throw back the thoughts upon the past or on themselves (*Taylor*). 4. To consider attentively (*Prior*). 5. To throw reproach or censure (*Swift*). 6. To bring reproach (*Dryden*).

REFLE'CTENT. *a.* (*reflectens*, Latin.) Bending back; flying back (*Digby*).

REFLECTING SEMICIRCLE. The objects of the reflecting circle or semicircle (and especially of that invented by sir Howard Douglas) are to combine the measuring principle with a circular or semicircular protractor, in such a manner that, in measuring any angle, the index or limb of the instrument shall pass over the whole of the measured angle.

By this contrivance any angle taken in the field may be at once protracted in actual magnitude on the sketch, without the trouble of reading off. This is particularly useful in military survey, where the true situations of objects can at once be determined, and the sketch corrected at the same time that it is taken.

The description of the instrument is as follows:

To the radius or limb of a semicircular (or circular) protractor ABC (plate 120, fig. 3.) the index glass DE is fixed. The horizon glass FG is fixed to a bar HI, which has a motion on the centre K. This bar slides upon a pin O attached to the limb or radius carrying the index glass, which pin is adjusted so that there shall be no apparent index error, and exactly in the same circle with the point K. The sliding bar will then move over half the real angle measured, and the principal limb protract the true angle.

Thus, the new reflecting circle or semicircle is divided into 180° or 360° instead of the double number as in the repeating circle, and the arc on which the divisions are engraven is equal to that of a sextant, whose radius is equal to the length of the sliding bar, that is, diameter of the circle.

A vernier is applied to read off with accuracy.

A 4-inch plotting or diagonal scale of a mile divided into yards, is engraven on the fixed limb of the instrument, by which addition all the cases of trigonometry can be solved by construction.

To those who have used the common sextant, the use of the reflecting semicircle will be obvious. It should be held in the right hand by the end of the fixed limb, and directed so that the left or the direct object is seen through the unsilvered part of the horizon glass. Apply the thumb of the left hand to the end of the moveable limb, and move it till the other object is seen reflected in the lower part of the horizon glass, and the angle is measured, which can be protracted at once. The

errors or mistakes arising from reading off in a hurry are thus avoided. There is no necessity for keeping a field-book on these rapid occasions. The operations of protracting the points and sketching the features of ground are combined; and the transfer of the sketch to the fair sheet is much sooner accomplished.

The above instrument is made by Mr. Cary, optician, No. 182, Strand.

For other instruments of reflection, see our article CIRCULAR INSTRUMENT.

REFLE'CTION. *s.* (from *reflect.*) 1. The act of throwing back (*Cheyne*). 2. The act of bending back (*Bentley*). 3. That which is reflected (*Shakspeare*). 4. Thought thrown back upon the past (*Denham*). 5. The action of the mind upon itself (*Locke*). 6. Attentive consideration (*South*). 7. Censure (*Prior*).

REFLECTION, or REFLEXION, in mechanics, is the return, or regressive motion of a moveable body, occasioned by the resistance of another body, which hinders it from pursuing its former course of direction.

Reflection is conceived, by the latest and best authors, as a motion peculiar to elastic bodies, by which, after striking on others which they cannot remove, they recede, or turn back, or aside, by their elastic power.

On this principle it is asserted, that there may be, and is, a period of rest between the incidence and the reflection; since the reflected motion is not a continuation of the other, but a new motion, arising from a new cause or principle, viz. the power of elasticity.

It is one of the great laws of reflection, that the angle of incidence is equal to the angle of reflection; i. e. that the angle which the direction of motion of a striking body makes with the surface of the body struck, is equal to the angle made between the same surface and the direction of motion after the stroke. See INCIDENCE and PERCUSSION.

Reflection of the rays of light, like that of other bodies, is their motion after being reflected from the surfaces of bodies.

The reflection of the rays of light from the surfaces of bodies, is the means by which those bodies become visible. And the disposition of bodies to reflect this or that kind of rays most copiously, is the cause of their being of this or that colour. Also, the reflection of light, from the surfaces of mirrors, makes the subject of catoptrics.

The reflection of light, Newton has shown, is not effected by the rays striking on the very parts of the bodies; but by some power of the body equally diffused throughout its whole surface, by which it acts upon the ray, attracting or repelling it without any real immediate contact. This power he also shows is the same by which, in other circumstances, the rays are refracted; and by which they are at first emitted from the lucid body.

Dr. Priestley says, it is not more probable, that the rays of light are transmitted from the sun, with an uniform disposition to be reflected or refracted, according to the circumstances of the bodies on which they impinge; and that the transmission of some of the rays, apparently under the same circumstances, with others that are reflected, is owing to the minute vibrations of the small parts of the surfaces of the mediums through which the rays pass; vibrations that are independent of action and reaction between the bodies and the particles of light at the time of their impinging, though probably excited by the action of preceding rays. See OPTICS, CATOPTRICS, MIRROR, &c.

As the rays of light are reflected by polished surfaces, so it is found that the rays of caloric have the same property. The Swedish chemist Scheele discovered, that the angle of reflection of the rays of caloric is equal to the angle of incidence. This has been more fully established by Dr. Herschel. Some very interesting experiments were made by professor Pictet of Geneva, which proved the same thing.

These experiments were conducted in the following manner. Two concave mirrors of tin, of nine inches focus, were placed at the distance of twelve feet two inches from each other. In the focus of the one was placed the bulb of a thermometer, and in that of the other a ball of iron two inches in diameter, which was just heated so as not to be visible in the dark. In the space of six minutes the thermometer rose 22°. A similar effect was produced by substituting a lighted candle in place of the ball of iron. Supposing that both the light and heat acted in the last experiment, he interposed between the two mirrors a plate of glass, with the view of separating the rays of light from those of caloric. The rays of caloric were thus interrupted by the plate of glass, but the rays of light were not perceptibly diminished. In nine minutes the thermometer sunk 14°; and in seven minutes after the glass was removed, it rose about 12°. He therefore justly concluded, that the caloric reflected by the mirror was the cause of the rise of the thermometer. He made another experiment, substituting boiling water in a glass vessel in place of the iron ball; and when the apparatus was adjusted, and a screen of silk which had been placed between the two mirrors removed, the thermometer rose 3°; namely, from 47° to 50°. The experiments were varied by removing the tin mirrors to the distance of 90 inches from each other. The glass vessel, with boiling water, was placed in one focus, and a sensible thermometer in the other. In the middle space between the mirrors, there was suspended a common glass mirror, so that either side could be turned towards the glass vessel. When the polished side of this mirror was turned towards the glass vessel, the thermometer rose only five-tenths of a degree; but when the other side, which was darkened, was turned towards the glass vessel, the thermometer rose 3° 5′. And in another experiment performed in the same way, the thermometer rose 3° when the polished side of the mirror was turned to the glass ves-

sel, and 9° when the other side was turned. These experiments show clearly, that the rays of caloric are reflected from polished surfaces, as well as the rays of light. Transparent bodies have the power of refracting the rays of caloric, as well as those of light. They differ also in their refrangibility. So far as experiment goes, the most of the rays of caloric are less refrangible than the red rays of light. The experiments of Dr. Herschel show that the rays of caloric, from hot or burning bodies, as hot iron, hot water, fires and candles, are refrangible, as well as the rays of caloric which are emitted by the sun. Whether all transparent bodies have the power of transmitting these rays, or what is the difference in the refractive power of these bodies, is not yet known.

The light which proceeds from the sun seems to be composed of three distinct substances. Scheele discovered, that a glass mirror held before the fire, reflected the rays of light, but not the rays of caloric; but when a metallic mirror was placed in the same situation, both heat and light were reflected. The mirror of glass became hot in a short time, but no change of temperature took place on the metallic mirror. This experiment shows that the glass mirror absorbed the rays of caloric, and reflected those of light; while the metallic mirror, suffering no change of temperature, reflected both. And if a plate of glass be held before a burning body, the rays of light are not sensibly interrupted, but the rays of caloric are intercepted; for no sensible heat is observed on the opposite side of the glass; but when the glass has reached a proper degree of temperature, the rays of caloric are transmitted with the same facility as those of light. And thus the rays of light and caloric may be separated. But the curious experiments of Dr. Herschel have clearly proved, that the invisible rays which are emitted by the sun have the greatest heating power. In these experiments the different coloured rays were thrown on the bulb of a very delicate thermometer, and their heating power was observed. The heating power of the violet, green, and red rays, were found to be to each other as the following numbers:

Violet - - - - - - -	16.0
Green - - - - - - -	22.4
Red - - - - - - - -	55.0

The heating power of the most refrangible rays was least, and this power increases as the refrangibility diminishes. The red ray, therefore, has the greatest heating power, and the violet, which is the most refrangible, the least. The illuminating power, it has been already observed, is greatest in the middle of the spectrum, and it diminishes towards both extremities; but the heating power, which is least at the violet end, increases from that to the red extremity; and when the thermometer was placed beyond the limit of the red ray, it rose still higher than in the red ray, which has the greatest heating power in the spectrum. The heating power of these invisible rays was greatest at the distance of half an inch beyond the red ray, but it was sensible at the distance of one inch and a half.

REFLE'CTIVE. *a.* (from *reflect.*) 1. Throwing back images (*Dryden*). 2. Considering things past; considering the operations of the mind (*Prior*).

REFLE'CTOR. *s.* Considerer (*Boyle*).

REFLE'X. *a.* (*reflexus*, Latin.) Directed backward (*Bentley*).

REFLEX. Reflexus. In botany. Bent back. Rami reflexi. Perpendiculariter dependentes. Delin. Pl.—Hanging down perpendicularly.—Reflexum folium. A reflex leaf: as in euphorbia portlandica.—Reflexum perianthium. A reflex perianth: as in asclepias and leontodon.—Reflexus flos. Reflexa corolla. Reflexa petala. A reflex flower, corol or petals: as in lilium chalcedonicum, cyclamen narcissus triandrus, &c.—Applied also to the stipule and bracte. See RETROFLEX.

REFLEX. *s.* (*reflexus*, Latin.) Reflection.

REFLEXIBI'LITY. *s.* (from *reflexible.*) The quality of being reflexible (*Newton*).

REFLE'XIBLE. *a.* (from *reflexus*, Latin.) Capable to be thrown back (*Cheyne*).

REFLE'XIVE. *a.* (*reflexus*, Lat.) Having respect to something past (*Hammond*).

REFLE'XIVELY. *ad.* In a backward direction (*Gov. of the Tongue*).

REFLO'AT. *s.* (*re* and *float.*) Ebb; reflux (*Bacon*).

To REFLOU'RISH. *v. n.* (*re* and *flourish.*) To flourish anew (*Milton*).

To REFLO'W. *v. n.* (*refluer*, French.) To flow back.

REFLU'ENT. *a.* (*refluens*, Lat.) Running back; flowing back (*Arbuthnot*).

REFLU'X. *s.* (*reflux*, French.) Backward course of water (*Brown*).

REFOCILLA'TION. *s.* (*refocillo*, Latin.) Restoration of strength by refreshment.

To REFO'RM. *v. a.* (*reformo*, Latin.) To change from worse to better (*Hooker*).

To REFO'RM. *v. n.* To pass by change from worse to better (*Atterbury*).

REFORM means a change from worse to better, a re-establishment or revival of former neglected discipline, or a correction of abuses therein. The term is much used in a monastic sense for the reducing an order or congregation of religious to the ancient severity of the rule from which it had gradually swerved, or even for improving on the ancient rule and institution itself, and voluntarily making it more severe. In this sense the order of St. Bernard is said to be only a reform of that of St. Benedict. In this country it is applied both to politics and religion, and may innocently be applied to any endeavours to change an establishment from worse to better.

REFORMATION, the act of reforming or correcting an error or abuse in religion, discipline, or the like. The Reformation, so called by way of eminence, is the separation of the protestants from the church of Rome, in the begin-

ning and towards the middle of the sixteenth century. See LUTHERANS and LUTHERANISM.

An event of such magnitude, with which the progress of the arts and universal learning is so intimately connected, demands a more enlarged and detailed account than the prescribed limits of our work will admit. It would, nevertheless, be highly improper wholly to omit the notice of so very important an era in the history of Europe.

At a time when the peace and harmony of the Romish church seemed fully established, and when the authority of the Holy See had just received a most signal triumph by the labours of the council of the Lateran; when the address and perseverance of Leo X. had surmounted a thousand difficulties, and given peace to his dominions; when Rome had begun once more to assume its ancient grandeur, and was again become the centre of genius, letters, and the arts; when the dark clouds of the middle ages were scattered before the rays of science, and the light of genius had begun to illumine the moral horizon, the attention of the whole Christian world was directed to an event that threatened nothing less than the speedy ruin of the papal authority, and the complete demolition of that fabric of religious magnificence which the labours of myriads had united to raise, and which the lapse of centuries had left rather established than impaired. It is curious to reflect, that what bid fair to have been the glory and security of the church, conspired to her destruction, and threatened her total overthrow. Leo X. in aiming to enhance the glory of his pontificate by the encouragement of literature and the patronage of the arts, was fostering in his bosom an enemy to destroy his peace and degrade his power. The seeds of learning which his father, Lorenzo de' Medici, had sown, and he so plentifully watered, sprung up to choak his pleasures, and reward him with trouble. No sooner had the human mind begun to be emancipated from its slavery, than it employed its newly restored liberty in bold and presumptuous investigations into the conduct of the Roman pontiffs, the extravagancies of the papal court, the foundations of church governments, and the truth of established doctrines. The errors and misconduct of the clergy were exposed to the shafts of ridicule and the remonstrances of reason. The hardy and intrepid genius of Dante, which placed the vicars of Christ in the infernal regions, lighted up the fire of Petrarca, and encouraged him to identify the court of Rome with that of ancient Babylon. He made the vices and errors of the church the subject of his sonnets, and the constant theme of his abuse. Protected by their genius, and respected for their character, these two great men not only escaped the censures of the Holy See, but emboldened the populace to question the infallibility of a church which had nothing but luxury in its train, and learning for its boast.

To support the expenses of a luxurious court, Leo X. had availed himself of an ancient custom in the church to raise money by the sale of indulgences, by which the purchasers were allowed the practice of several sins, and a deliverance from the pains of purgatory. To defend these indulgences, it was urged, that as one drop of Christ's blood is sufficient to atone for the sins of the whole world, the remainder of blood shed by the death of the Saviour belonged to the church, and that its efficacy might be sold out to the people. It was supposed also, that to the church belonged all the good works of the saints beyond what were employed in their own justification. These superabundant merits were accordingly sold to the unthinking multitude at various prices, according to the nature of the offence for which they were to atone. The form of these indulgences not being very generally known, we will give an exact copy of one of these most extraordinary instruments.

"May our Lord Jesus Christ have mercy upon thee, and absolve thee by the merits of his most holy passion. And I, by his authority, that of his blessed apostles, Peter and Paul, and of the most holy pope, granted and committed to me in these parts, do absolve thee, first from all ecclesiastical censures, in whatever manner they have been incurred; and then, from all thy sins, transgressions, and excesses, how enormous soever they may be, even from such as are reserved for the cognizance of the holy see; and as far as the keys of the holy church extend, I remit you all punishment you deserve in purgatory on their account; and I restore you to the holy sacraments of the church, to the unity of the faithful, and to that innocence and purity you possessed at baptism; so that when you die, the gates of punishment shall be shut, and the gates of the paradise of life shall be opened; and if you shall not die at present, this grace shall remain in full force when you are at the point of death. In the name of the Father, of the Son, and of the Holy Ghost. Amen."

This is the form of absolution sold by the agents of Leo X. in various parts of the Christian world; an instrument so absurd, that were it not well authenticated, and had we not even in our day a similiar instance of imposture on the one hand and credulity on the other in the seals disposed of by Johanna Southcott, one might be tempted to doubt the truth of its existence.

The promulgation of these indulgences in Germany, together with a share arising from the profits in the sale of them, was assigned to Albert, elector of Mentz, and archbishop of Magdeburg, who, as his chief agent for retailing them, employed one Tetzel, a Dominican friar of licentious morals, but of a bold and active spirit. Tetzel, assisted by the monks of his order, executed this ignoble commission with great zeal and success; but with the most shameless indecency and indiscretion; at the same time magnifying the benefits of these indulgences in the most extravagant manner. To such enormities did Tetzel proceed in describing the efficacy of these pretended dispensations, that he even said "if any one had ravished the mother of God, he (Tetzel) had wherewithal to efface his guilt." He also boasted, that "he had saved more souls from hell by these indulgences, than St. Peter had converted to christianity by his preaching." These enormous blasphemies and abuses roused the indignation of Martin Luther, a monk of the Augustinian Eremites, and professor of divinity in the academy at Wittemberg, to such a pitch of fervour, that he began to declaim with boldness against these scandals of the Christian name. In ninety-five propositions, maintained publicly at Wittemberg, on the 30th of September 1517, he censured the extravagant extortions of the questors, and plainly pointed out the Roman pontiff as a partaker of their guilt, since he suffered the people to be seduced, by such delusions, from placing their principal confidence in Christ, the only proper object of their trust. So daring an opposition from an

obscure monk in a corner of Germany, excited the surprise and admiration of all the world, except Rome itself, which seemed most likely to have been first alarmed. Luther had no sooner published his propositions than multitudes flocked to his standard, and joined him in the outcry against the shameful abominations of the Church of Rome. It was, however, some time before an irruption took place; or that the friends of reform declared open war against the decrees and authority of the church. Tetzel and others vainly attempted to defend the indulgences; but were continually repulsed, and put to shame by the arguments and intrepidity of Luther. The history of the various disputes which called forth the energies of this reformer, and exposed the nakedness of the church, is both interesting and curious: we must nevertheless pass over this portion of the history of the reformation in Germany; observing that Luther and his adherents soon found most powerful auxiliaries in the University of Wittemberg, and the protection of Frederick, elector of Saxony.

The same corruptions in the church of Rome which Luther condemned had been attacked long before his appearance, and the same opinions which he propagated had been published in different places, and supported by the same arguments. Waldus in the 12th century, Wickliff in the 14th, and Huss in the 15th, had inveighed against the errors of popery with great boldness, and confuted them with more ingenuity and learning than could have been expected in those illiterate ages in which they flourished. But all these premature attempts towards a reformation proved abortive. Many powerful causes contributed to facilitate Luther's progress, which either did not exist, or did not operate with full force in their days; the principal of these we shall here enumerate. The long and scandalous schism which divided the church, during the latter part of the fourteenth and the beginning of the fifteenth centuries, had a great effect in diminishing the veneration with which the world had been accustomed to view the papal dignity. The proceedings of the councils of Constance and Basil spread this disrespect for the Romish see still wider, and by their bold exertion of authority in deposing and electing popes, taught the world that there was in the church a jurisdiction superior even to the papal power, which they had long believed to be supreme. The wound given on that occasion to the papal authority was scarcely healed, when the pontificates of Alexander VI. and Julius II. both able princes, but detestable ecclesiastics, raised new scandal in Christendom. Besides, many of the dignified clergy, secular as well as regular, neglected the duties of their office, and indulged themselves without reserve in all the vices to which great wealth and idleness naturally give birth: and gross ignorance and low debauchery rendered the inferior clergy as contemptible as the others were odious. So that we find, long before the sixteenth century, that many authors of reputation give such description of the dissolute morals of the clergy, as seem almost incredible in the present age. The scandal of these crimes, which very generally prevailed, was greatly increased by the facility with which such as committed them obtained pardon. The exorbitant wealth of the church, the vast personal immunities of ecclesiastics, and their encroachments on the jurisdiction of the laity, and their various devices to secure their usurpations, created much dissatisfaction among the people, and disposed them to pay particular attention to the invectives of Luther. Besides these causes of his rapid progress, we may also reckon the invention of the art of printing, about half a century before his time, the revival of learning at the same period, and the bold spirit of inquiry which it excited in Europe; so that many were prepared to embrace his doctrines, who did not really wish success to his undertaking. In the writings of Beuchlin, Hutter, and the other revivers of learning in Germany, the corruptions of the church of Rome are censured with an acrimony of style little inferior to that of Luther himself. The raillery and oblique censures of Erasmus in particular, upon the errors of the church, as well as upon the ignorance and vices of the clergy, prepared the way for Luther's invectives and more direct attacks. To all which we may add, that the theological doctrines of popery were so repugnant to the spirit of Christianity, and so destitute of any foundation in reason, in the word of God, or in the practice of the church, that this circumstance combined in favouring the progress of Luther's opinions, and in weakening the resistance of his adversaries.

The rise of the reformation in Switzerland was at least as early as in Germany; for Ulric Zuingle had, in the year 1516, begun to explain the Scriptures to the people, and to censure, though with great prudence and moderation, the errors of a corrupt church. He had very noble and extensive ideas of a general reformation, at the time when Luther retained almost the whole system of popery, indulgences excepted; and he had actually called in question the authority and supremacy of the pope, before the name of Luther was known in that country. In the year 1524, Nuremberg, Francfort, Hamburgh, and several other cities in Germany, of the first rank, openly embraced the reformed religion, and by the authority of their magistrates abolished the mass, and the other superstitious rites of popery. The elector of Brandenburgh, the dukes of Brunswick and Lunenburgh, and prince of Anhalt, became avowed patrons of Luther's opinions, and countenanced the preaching of them among their subjects. The reformers derived great advantage from the transactions of the diet at Nuremberg, which presented to the pope a catalogue of a hundred grievances, which the empire imputed to the iniquitous dominion of the papal see. The progress of the reformation in Germany was likewise promoted by the proceedings of the diet, held at Spire in the years 1526 and 1529.

During these transactions in Germany, the dawn of truth arose upon other nations. The light of the reformation spread itself far and wide; and almost all the European states welcomed its salutary beams, and exulted in the prospect of an approaching deliverance from the yoke of superstition and spiritual despotism. Some of the most considerable provinces of Europe had already broke their chains, and openly withdrawn themselves from the discipline of Rome and the jurisdiction of its pontiff. The reformed religion was propagated in Sweden, soon after Luther's rupture with Rome, by Olaus Petri, one of his disciples, who was countenanced and encouraged by the valiant and public-spirited prince Gustavus Vasa Ericson, to whose firmness and magnanimity it was owing, that from the year 1527 the papal empire in Sweden was entirely overturned, and

Gustavus declared head of the church. The light of the reformation was also received in Denmark so early as the year 1521, in consequence of the ardent desire discovered by Christian or Christiern II. for purposes of mere ambition, of having his disciples instructed in the doctrines of Luther. His successor Frederick, duke of Holstein and Silesia, contributed greatly to the progress of the reformation, by his successful attempts in favour of religious liberty, at the assembly of states that was held at Odensee, in the year 1527, when he procured the publication of that famous edict which declared every subject of Denmark free, either to adhere to the tenets of the church of Rome, or embrace the doctrine of Luther; that no person should be molested on account of his religion; that a royal protection should be granted to the Lutherans; and that ecclesiastics of every order should be allowed to marry. But the honour of accomplishing this glorious work was reserved for Christiern III. a prince equally distinguished by his piety and prudence. The religious doctrine, discipline, and worship of this kingdom, were settled according to a plan laid down by Bugenhagius. And the assembly of the states at Odensee, in 1539, gave a solemn sanction to all these transactions, and thus the work of reformation was brought to perfection in Denmark.

In France, the auspicious patronage of Margaret, queen of Navarre, sister to Francis I. encouraged several pious and learned men, whose religious sentiments were the same as her own, to propagate the principles of the reformation, and even to erect several protestant churches in that kingdom. It appears, that, so early as the year 1523, there were many, and even persons of rank, and some of the episcopal order, who had conceived the utmost aversion both against the doctrine and tyranny of Rome. But the wavering and inconsistent conduct of Francis I. rendered the situation of the protestants in this country always precarious, often distressed. Upon the whole, we may observe, that, before the diet of Augsburg, the doctrine of Luther had made a considerable, though perhaps a secret progress in Spain, Hungary, Bohemia, Britain, Poland, and the Netherlands; and had, in all these countries, many friends, of whom several repaired to Wittemberg, to improve their knowledge, and enlarge their views under such an eminent master. At this diet, held in 1530, the Augsburg or Augustan Confession was presented to the emperor Charles V. and after many debates between the friends of liberty and the votaries of Rome, the latter prevailed; and the diet, in compliance with the opinion and remonstrances of Campeggio, the papal nuncio, issued a decree, condemning most of the peculiar tenets held by the protestants; forbidding any person to protect or tolerate those who taught them; enjoining a strict observance of the established rites, and prohibiting any farther innovation, under severe penalties. Those who refused to obey this decree were declared incapable of acting as judges, or of appearing as parties in the imperial chamber, the supreme court of judicature in the empire. The protestants, alarmed at this severity of the decree, assembled at Smalcal, and concluded a league of mutual defence against all aggressors, by which they formed the protestant states of the empire into one regular body; and they resolved to apply to the kings of England, France, and Denmark, to implore them to assist and patronize this new confederacy. After various negociations between the emperor and the protestant princes, terms of pacification were agreed upon at Nuremberg, and ratified solemnly in the diet at Ratisbon, in the year 1532. In this treaty it was stipulated, that universal peace be established in Germany, until the meeting of a general council, the convocation of which, within six months, the emperor shall endeavour to procure; that no person be molested on account of religion; that a stop be put to all processes begun by the imperial chamber against protestants, and the sentences already passed to their detriment be declared void. On their part, the protestants engaged to assist the emperor with all their forces in resisting the invasion of the Turks. Thus the protestants, by their firmness, unanimity, and dexterity in availing themselves of the emperor's situation, obtained terms which amounted almost to a toleration of their religion. But neither the emperor nor the pope were disposed to abide by the unbiassed sense of a general council, assembled, as the protestants wished, within the limits of the empire, but determined to decide their religious debates by the force of arms. After many evasions and delays, it was proposed, in the 1545, to assemble a council at Trent, which was vigorously opposed by the protestants. The emperor and the pope had mutually agreed to destroy all who should dare to oppose this council. The meeting of that assembly was to serve as a signal for their taking arms; and accordingly its deliberations were scarcely begun, in the year 1546, when the protestants perceived undoubted marks of a formidable union to overwhelm and crush them by one blow. The fathers, assembled in the council of Trent, promulgated their decrees; and the protestant princes in the diet of Ratisbon protested against their authority, and were, in consequence of this, proscribed by the emperor, who raised an army to reduce them to obedience. Thus commenced the war of Smalcald, which was prosecuted with various success on both sides, till, in the year 1552, Charles was surprised at Inspruck by Maurice of Saxony, and was constrained to conclude at Passau the famous treaty of pacification with the protestants, which is considered by those of Germany as the basis of their religious liberty; and to promise in six months to assemble a diet, in which all the tumults and dissentions that had been occasioned by a variety of sentiments in religious matters should be entirely removed. This diet, though not assembled at the stipulated time, met, however, at Augsburg, in the year 1555, and terminated those deplorable scenes of bloodshed, desolation, and discord, that had so long afflicted both church and state by that religious peace, as it is commonly called, which secured to the protestants the free exercise of their religion, and established this inestimable liberty upon the firmest foundations. For after various debates, the following memorable acts were passed: that the protestants, who followed the confession of Augsburg, should for the future be considered as entirely exempted from the jurisdiction of the Roman pontiff, and from the authority and superintendance of the bishops; that they were left at perfect liberty to enact laws for themselves, relating to their religious sentiments, discipline, and worship; that all the inhabitants of the German empire should be allowed to judge for themselves in religious matters, and to join themselves to that church whose doctrine and worship they thought the purest and

most consonant to the spirit of Christianity; and that all those who should injure or persecute any person under religious pretexts, and on account of their opinions, should be declared, and proceeded against, as public enemies of the empire, invaders of its liberty, and disturbers of its peace.

In the year 1533 Henry VIII. king of England, who, in the beginning of these troubles, had opposed the doctrine and views of Luther with the utmost vehemence, having sued for a divorce from Catharine of Arragon, his brother's widow, at the court of Rome, for almost six years, during which period Clement VII. negotiated, promised, retracted, and concluded nothing, determined to apply to another tribunal for that decree which he had unsuccessfully solicited at Rome. Cranmer, archbishop of Canterbury, by a sentence founded on the authority of universities, doctors, and rabbies, who had been consulted with respect to the point, annulled the king's marriage with Catharine; and Anna Boleyn, whose charms had captivated the king, was acknowledged as queen of England. Clement, apprehensive lest England would revolt from the holy see, determined to give Henry such satisfaction as might still retain him within the bosom of the church. But the violence of the cardinals precipitated him, in 1534, to issue a bull rescinding Cranmer's sentence, confirming Henry's marriage with Catharine, and declaring him excommunicated, if, within a time specified, he did not abandon the wife he had taken, and return to her whom he had deserted. Enraged at this unexpected decree, Henry kept no longer any measures with the court of Rome; his subjects seconded his resentment; an act of parliament was passed, abolishing the papal power and jurisdiction in England; by another the king was declared supreme head of the church, and all the authority of which the popes were deprived was vested in him; the monasteries were suppressed, and their revenues applied to other purposes. Henry, however, with the caprice peculiar to his character, continued to defend the doctrines of the Romish church as fiercely as he attacked its jurisdiction. He alternately persecuted the protestants for rejecting the former, and the catholics for acknowledging the latter. Nevertheless his subjects having been encouraged, by his example, to break some of their fetters, were so impatient to shake off all that remained, that in the following reign, under his son Edward VI. with the general applause of the nation, a total separation was made from the church of Rome in articles of doctrine, as well as in matters of discipline and jurisdiction. In 1553 his death retarded the progress of the reformation; and his sister Mary, who succeeded him, imposed a-new the arbitrary laws and tyrannical yoke of Rome upon the people of England. But the execution of a great number of persons, who were burnt for the protestant faith in the five years of her persecuting and bloody reign, so alienated the people from popery, that queen Elizabeth, her sister, found it no hard matter to deliver her subjects from the bondage of Rome, and to establish that form of religious doctrine and ecclesiastical government, which still subsists in England.

The seeds of the reformation were very early sown in Scotland, by several noblemen of that nation, who had resided in Germany during the religious disputes that divided the empire. The first and most eminent opposer of the papal jurisdiction was John Knox, a disciple of Calvin, who set out from Geneva for Scotland in 1559, and in a little while prevailed with the greatest part of the Scotch nation entirely to abandon the superstitions of Rome, and to aim at nothing less than the total extirpation of popery. From that period to the present times the form of doctrine, worship and discipline, that had been established at Geneva by the ministry of Calvin, has been maintained in Scotland with invincible obstinacy and zeal, and every attempt to introduce into that kingdom the rites and government of the church of England has proved impotent and unsuccessful. See PRESBYTERIANS: see also Dr. Cook's History of the Reformation in Scotland.

The cause of the reformation in Ireland underwent the same vicissitudes that had attended it in England. When Henry VIII. after the abolition of the papal authority, was declared supreme head of the church of England, George Brown, a native of England, and a monk of the Augustin order, whom that monarch had created, in the year 1535, archbishop of Dublin, began to act with the utmost vigour in consequence of this change in the hierarchy. He purged the churches of his diocese from superstition in all its forms, pulled down images, destroyed relics, abolished absurd and idolatrous rites, and by the influence as well as authority he had in Ireland, caused the king's supremacy to be acknowledged in that nation. Henry showed soon after that this supremacy was not a vain title, for he banished the monks out of that kingdom, confiscated their revenues, and destroyed their convents. In the reign of Edward VI. farther progress was made in the reformation, but the accession of Mary retarded it, in consequence of which Brown and other protestant bishops were deprived of their dignities in the church. When Elizabeth ascended the throne, the Irish were again obliged to submit to the form of worship and discipline established in England.

The reformation had not been long established in Britain, when the Belgic provinces, united by a respectable confederacy, withdrew from their spiritual allegiance to the Roman pontiff. The means which Philip II. king of Spain used to obstruct the reformation, promoted it: the nobility formed themselves into an association, in the year 1566, and roused the people; who, under the heroic conduct of William of Nassau, prince of Orange, seconded by the succours of England and France, delivered this state from the Spanish yoke: in consequence of which the reformed religion, as it was professed in Switzerland, was established in the United Provinces: and, at the same time, an universal toleration granted to those whose religious sentiments were of a different nature, whether they retained the faith of Rome, or embraced the reformation in another form, provided that they made no attempts against the authority of the government, or the the tranquillity of the public. See, on the subject of this article, Robertson's Hist. of Charles V. vol. ii. p. 113, &c. vol. iii. p. 44, &c. Mosheim's Eccl. Hist. Eng. ed. 8vo. vol. iii. p. 284, &c. Burnet's Hist. of the Reformation, passim. Cope's Memoirs of the House of Austria. Villers on the Influence of the Reformation, &c.

REFORMER. *s.* (from *reform.*) 1. One who makes a change for the better; an amender (*Sprat*). 2. One of those who changed religion from popish corruptions and innovations (*Bacon*).

REFRACTION.

To REFRA'CT. *v. n.* (*refractus*, Lat.) To break the natural course of rays (*Cheyne*).

REFRACT, in botany. Refracted. As it were broken.—Refract corol. Recurvata angulo acuto. Delin. Pl. Bent back at an acute angle. See RETROFRACT.

REFRACTING TELESCOPE. See TELESCOPE.

REFRACTION, in mechanics, is the deviation of a moving body from its direct course, by reason of the different density of the medium it moves in; or a flexion and change of determination, occasioned by a body's passing obliquely out of one medium into another of a different density.

REFRACTION OF LIGHT, in optics, is an inflection or deviation of the rays from their rectilinear course on passing obliquely out of one medium into another of a different density.

That a body may be refracted, it is necessary that it should fall obliquely on the second medium: in perpendicular incidence there is no refraction. Yet Voscius and Snellius imagined they had observed a perpendicular ray of light undergo a refraction; a perpendicular object appearing in the water nearer than it really was: but this was attributing that to a refraction of the perpendicular rays, which was owing to the divergency of the oblique rays after refraction, from a nearer point. Yet there is a manifest refraction even of perpendicular rays found in island crystal.

Rohault adds, that though an oblique incidence be necessary in all other mediums we know of, yet the obliquity must not exceed a certain degree; if it do, the body will not penetrate the medium, but will be reflected instead of being refracted. Thus, cannon-balls, in sea engagements, falling very obliquely on the surface of the water, are observed to bound or rise from it, and to sweep the men from off the enemy's decks. And the same thing happens to the little stones with which children make their ducks and drakes along the surface of the water.

The ancients confounded refraction with reflection; and it was Newton who first taught the true difference between them. He shews however that there is a good deal of analogy between them, and particularly in the case of light.

The laws of refraction of the rays of light in mediums differently terminated, i. e. whose surfaces are plane, concave, and convex, make the subject of dioptrics.—By refraction it is, that convex glasses, or lenses, collect the rays, magnify objects, burn, &c. and hence the foundation of microscopes, telescopes, &c.—And by refraction it is, that all remote objects are seen out of their real places; particularly, that the heavenly bodies are apparently higher than they are in reality. The refraction of the air has many times so uncertain an influence on the places of celestial objects near the horizon, that wherever refraction is concerned, the conclusions deduced from observations that are much affected by it will always remain doubtful, and sometimes too precarious to be relied on. See OPTICS and DIOPTRICS.

The true law of refraction, viz. that the ratio of the sines of the angles made by the perpendicular (to the plane bounding the mediums) with the incident and refracted rays, is a constant and fixed ratio, was first discovered by Willebrord Snell, professor of mathematics, at Leyden. From this law it follows that one angle of inclination, and its corresponding refracted angle, being found by observation, the refracted angles corresponding to the several other angles of inclination are thence easily computed. Now Zahnius and Kircher have found that if the angle of inclination be 70°, the refracted angle out of air into glass will be 38° 50′; on which principle Zahnius has constructed a table of these refractions for the several degrees of the angle of inclination; a specimen of which here follows:

Angle of Inclination.	Refracted Angle.			Angle of Refraction.		
°	°	′	″	°	′	″
1	0	40	5	0	19	55
2	1	20	6	0	39	54
3	2	0	4	0	59	56
4	2	40	5	1	19	55
5	3	20	3	1	39	57
10	6	39	16	3	20	44
20	13	11	35	6	48	25
30	19	29	29	10	30	31
45	28	9	19	16	50	41
90	41	51	40	48	8	20

Hence it appears, that if the angle of inclination be less than 20°, the angle of refraction out of air into glass is almost $\frac{1}{3}$ of the angle of inclination; and therefore a ray is refracted to the axis of refraction by almost a third part of the quantity of its angle of inclination. And on this principle it is that Kepler, and most other dioptrical writers, demonstrate the refractions in glasses; though, in estimating the law of these refractions, he followed the example of Alhazen and Vitello, and sought to discover it in the proportion of the angles, and not in that of the sines, or cosecants, as discovered by Snell, as mentioned above.

The refractive powers of several substances, as determined by different philosophers, may be seen in the following tables; in which the ray is supposed to pass out of air into each of the substances, and the annexed numbers shew the proportion to unity or 1, between the sines of the angles of incidence and refraction.

1. By sir Isaac Newton's observations.

Air	0·9997
Rain water	1·3358
Spirit of wine	1·3698
Oil of vitriol	1·4285
Alum	1·4577
Oil olive	1·4666
Borax	1·4667
Gum arabic	1·4771
Linseed oil	1·4814
Selenites	1·4878
Camphor	1·5000
Dantzic vitriol	1·5000
Nitre	1·5238
Sal gem	1·5455
Glass	1·5500
Amber	1·5556
Rock crystal	1·5620
Spirit of turpentine	1·5625
A yellow pseudo-topaz	1·6429
Island crystal	1·6666
Glass of antimony	1·8889
A diamond	2·4390

2. By Mr. Hawksbee.

Water	1·3359
Spirit of honey	1·3359
Oil of amber	1·3377
Human urine	1·3419
White of an egg	1·3511
French brandy	1·3625
Spirit of wine	1·3721
Distilled vinegar	1·3721
Gum ammoniac	1·3723
Aqua regia	1·3898
Aqua fortis	1·4044
Spirit of nitre	1·4076
Crystaline humour of an ox's eye	1·4635
Oil of vitriol	1·4262
Oil of turpentine	1·4833
Oil of amber	1·5010
Oil of cloves	1·5136
Oil of cinnamon	1·5340

3. By Mr. Euler, junior.

Rain or distilled water	1·3358
Well water	1·3362
Distilled vinegar	1·3442
French wine	1·3458
A solution of gum arabic	1·3467
French brandy	1·3600
Ditto a stronger kind	1·3618
Spirit of wine rectified	1·3683
Ditto more highly rectified	1·3706
White of an egg	1·3685
Spirit of nitre	1·4025
Oil of Provence	1·4651
Oil of turpentine	1·4822

Refraction (Atmospherical). It is evident from the nature and progression of light that rays in passing from any object through the atmosphere, or part of it, to the eye, do not proceed in a right line; but the atmosphere being composed of an infinitude of strata (if we may so call them) whose density increases as they are posited nearer the earth, the luminous rays which pass through it are acted on as if they passed successively through media of increasing density, and are therefore inflected more and more towards the earth as the density augments. In consequence of this it is, that rays from objects, whether celestial or terrestrial, proceed in curves which are concave towards the earth; and thus it happens, since the eye always refers the place of objects to the direction in which the rays reach the eye, that is, to the direction of the tangent to the curve at that point, that the apparent or observed elevations of objects are always greater than the true ones. The difference of these elevations, which is, in fact, the effect of refraction, is, for the sake of brevity, called refraction: and it is distinguished into two kinds, horizontal, or terrestrial refraction, being that which affects the altitudes of hills, towers, and other objects on the earth's surface; and astronomical refraction, or that which is observed with regard to the altitudes of heavenly bodies. Refraction is found to vary with the state of the atmosphere, in regard to heat or cold, humidity or siccity, &c.: so that determinations obtained for one state of the atmosphere will not answer correctly for another, without modification. Tables commonly exhibit the refraction at different altitudes, for some assumed mean state.

2. With regard to the horizontal refraction, the following method of determining it has been successfully practised in the English Trigonometrical Survey.

Let A, A,′ pl. 149, fig. 2, be two elevated stations on the surface of the earth, BD the intercepted arc of the earth's surface, C the earth's centre, AH′, A′H, the horizontal lines at A, A′, produced to meet the opposite vertical lines CH′, CH. Let a, a', represent the apparent places of the objects A, A′, then is $a'AA'$ the refraction observed at A, and $aA'A$ the refraction observed at A′; and half the sum of those angles will be the horizontal refraction, if we assume it equal at each station.

Now, an instrument being placed at each of the stations A, A′, the reciprocal observations are made at the same instant of time, which is determined by means of signals or watches previously regulated for that purpose; that is, the observer at A takes the apparent depression of A′, at the same moment that the other observer takes the apparent depression of A.

In the quadrilateral ACA′I, the two angles A, A′, are right angles, and therefore the angles I and C are together equal to two right angles: but the three angles of the triangle IAA′ are together equal to two right angles; and consequently the angles A and A′ are together equal to the angle C, which is measured by the arc BD. If therefore the sum of the two depressions $HA'a$, $H'Aa'$ be taken from the sum of the angles HA′A, H′AA′, or, which is equivalent, from the angle C, (which is known, because its measure BD is known); the remainder is the sum of both refractions, or angles $aA'A$, $a'AA'$. Hence this rule—take the sum of the two depressions from the measure of the intercepted terrestrial arc, half the remainder is the refraction.

3. If, by reason of the minuteness of the contained arc BD, one of the objects, instead of being depressed, appears elevated, as suppose A′ to a'': then the sum of the angles $a''AA'$ and $aA'A$ will be greater than the sum IAA′+IA′A, or than C, by the angle of elevation $a''AA'$; but if from the former sum there be taken the depression HA′A, there will remain the sum of the two refractions. So that in this case the rule becomes as follows: take the depression from the sum of the contained arc and elevation, half the remainder is the refraction.

4. The quantity of this terrestrial refraction is estimated by Dr. Maskelyne at one-tenth of the distance of the object observed, expressed in degrees of a great circle. So, if the distance be 10000 fathoms, its 10th part 1000 fathoms, is the 60th part of a degree of a great circle on the earth, or 1′, which therefore is the refraction in the altitude of the object at that distance.

But M. Le Gendre is induced, he says, by several experiments, to allow only $\frac{1}{14}$th part of the distance for the refraction in altitude. So that, on the distance of 10000 fathoms, the 14th part of which is 714 fathoms, he allows only 44″ of terrestrial refraction, so many being contained in the 714 fathoms. See his Memoir concerning the Trigonometrical Operations, &c.

Again, M. Delambre, an ingenious French astronomer, makes the quantity of the terrestrial refraction to be the 11th part of the arch of distance. But the English measurers, especially colonel Mudge, from a multitude of exact observations, determine the quantity of the medium refraction to be the 12th part of the said distance.

The quantity of this refraction, however, is found to vary considerably, with the different states of the weather and atmosphere, from the $\frac{1}{5}$th to the $\frac{1}{18}$th of the contained arc. Trigonometrical Survey, vol. i. p. 160, 355.

Having thus given the mean results of observations on the terrestrial refraction, it may not be amiss, though we cannot enter at large into the investigation, to present here a correct table of mean astronomical refractions. The table which has been most commonly given in books of astronomy is Dr. Bradley's, computed from the rule $r = 57'' \times \cot.\ (a + 3r)$, where a is the altitude, r the refraction, and $r = 2'\,35''$ when $a = 20°$. But it has been found by numerous observations, that the refractions thus computed are rather too small. Laplace, in his Mecanique Celeste, tome iv. p. 27, deduces a formula which is strictly similar to Bradley's; for it is $r = m \times \tan\ (z - nr)$ where z is the zenith distance, &c. m and n are two constant quantities to be determined from observation. The only advantage of the formula given by the French philosopher over that given by the English astronomer, is, that Laplace and his colleagues have found more correct coefficients than Bradley had.

Now, if R = 57° 2957795, the arc equal to the radius, if we make $m = \frac{k\,R}{n}$, (where k is a constant coefficient which, as well as n, is an abstract number,) the preceding equation will become

$$\frac{nr}{R} = k \times \tan\ (z - nr).$$

Here, as the refraction r is always very small, as well as the correction nr, the trigonometrical tangent of the arc nr may be substituted for $\frac{nr}{R}$; thus we shall have

$$\tan.\ nr = k.\ \tan\ (z - nr).$$

But $nr = \frac{1}{2}z - (\frac{1}{2}z - nr) \ldots\ldots z - nr = \frac{1}{2}z + (\frac{1}{2}z - nr)$; consequently

$$\frac{\tan nr}{\tan\ (z - nr)} = \frac{\tan\left(\frac{z}{2} - \frac{z - 2nr}{2}\right)}{\tan\left(\frac{z}{2} + \frac{z - 2nr}{2}\right)} =$$

$$\frac{\sin z - \sin\ (z - 2nr)}{\sin z + \sin\ (z - 2nr)} = k.$$

Hence, $\sin\ (z - 2nr) = \frac{1 - k}{1 + k} \cdot \sin z.$

This formula is easy to use, when the coefficients n and $\frac{1 - k}{1 + k}$ are known: and it has been ascertained, by a mean of many observations, that these are 4 and ·99765175 respectively. Thus Laplace's equation becomes

$$\sin\ (z - 8r) = \cdot 99765175 \sin z:$$

and from this the following table has been computed. Besides the refractions, the differences of refraction, for every 10 minutes of altitude, are given; an addition which will render the table more extensively useful in all cases where great accuracy is required.

TABLE *of Refractions. Barom.* 29·92 *inch. Fah. Thermom.* 54°.

Altitude appar.	Refractions.	Differ. 10′.	Alti. appar.	Refractions.	Diff. 10′	Alt. app.	Refractions.	Diff 10′	Alt. app.	Refr.	Diff. 10′.
D. M.	M. S.	S.	D. M	M. S.	S.	D.	M. S.	S.	D.	S.	S.
0 0	33 46·3	112·0	7 0	7 24·8	9·5	14	3 49·8	2·58	56	39·3	0·25
10	31 54·3	105·0	10	7 15·3	9·0	15	3 34·3	2·28	57	37 8	0·24
20	30 9·3	97·3	20	7 6·3	8·6	16	3 20·6	2·02	58	36·4	0·24
30	28 32·1	89·8	30	6 57·7	8·1	17	3 8·5	1·82	59	35·●	0·24
40	27 2·2	83·6	40	6 49·6	7·7	18	2 57·6	1·65	60	33·6	0·23
50	25 38·6	77·4	50	6 41·9	7·5	19	2 47·7	1·48	61	32·3	0·22
1 0	24 21·2	71·6	8 0	6 34·4	7·3	20	2 38·8	1·37	62	31·0	0·22
10	23 9·6	66·2	10	6 27·1	7·1	21	2 30·6	1·24	63	29·7	0·21
20	22 3·4	61·5	20	6 20·0	6·9	22	2 23·2	1·11	64	28·4	0·21
30	21 1·9	57·1	30	6 13·1	6·7	23	2 16·5	1·05	65	27·2	0·20
40	20 4·8	53·3	40	6 0·4	6·5	24	2 10·2	0·98	66	25·9	0·20
50	19 11·5	49·3	50	5 59·9	6·3	25	2 4·3	0·90	67	24·7	0·20
2 0	18 22·2	45·9	9 0	5 53·6	6·2	26	1 58·9	0·83	68	23·5	0·20
10	17 36·3	43·1	10	5 47·4	5·9	27	1 53·9	0·78	69	22·4	0·20
20	16 53·2	39·8	20	5 41·5	5·7	28	1 49·2	0·73	70	21·2	0·20
30	16 13·4	37·4	30	5 35·8	5·5	29	1 44·8	0·70	71	20·0	0·20
40	15 36·0	35·1	40	5 30·3	5·3	30	1 40·6	0·65	72	18·9	0·19
50	15 0·9	32·8	50	5 25·0	5·2	31	1 36·7	0·60	73	17·8	0·18
3 0	14 28·1	30·8	10 0	5 19·8	5·1	32	1 33·1	0·58	74	16·7	0·18
10	13 57·3	28·8	10	5 14·7	5·0	33	1 29·6	0·56	75	15·6	0·18
20	13 28·5	27·2	20	5 9·7	4·8	34	1 26·2	0·53	76	14·5	0·18
30	13 1·3	25·7	30	5 4·9	4·6	35	1 23·1	0·50	77	13·5	0·17
40	12 35·6	24·3	40	5 0·3	4·4	36	1 20·1	0·48	78	12·4	0·17
50	12 11·3	23·0	50	4 55·9	4·2	37	1 17·2	0·47	79	11·3	0·17
4 0	11 48·3	21·7	11 0	4 51·7	4·1	38	1 14·4	0·43	80	10·3	0·17
10	11 26·6	20·5	10	4 47·6	4·0	39	1 11·8	0·42	81	9·2	0·17
20	11 6·1	19·4	20	4 43·6	4·0	40	1 9·3	0·40	82	8·2	0·17
30	10 46·7	18·4	30	4 39·6	3·9	41	1 6·9	0·38	83	7·2	0·17
40	10 28·3	17·4	40	4 35·7	3·9	42	1 4·6	0·37	84	6·1	0·17
50	10 10·9	16·6	50	4 31·8	3·8	43	1 2·4	0·35	85	5·1	0·17
5 0	9 54·3	15·9	12 0	4 28·0	3·7	44	1 0·3	0·34	86	4·1	0·17
10	9 38·4	15·0	10	4 24·3	3·6	45	0 58·2	0·33	87	3·1	0·17
20	9 23·4	14·4	20	4 20·7	3·5	46	0 56·2	0·32	88	2·0	0·17
30	9 9·0	13·7	30	4 17·2	3·4	47	0 54·3	0·31	89	1·0	0·17
40	8 55·3	13·0	40	4 13·8	3·2	48	0 52·4	0·30	90	0·0	
50	8 42·3	12·4	50	4 10·6	3·1	49	0 50·6	0·29			
6 0	8 29·9	11·8	13 0	4 7·5	3·1	50	0 48·9	0·28			
10	8 18·1	11·5	10	4 4·4	3·0	51	0 47·2	0·27			
20	8 6·6	11·0	20	4 1·4	3·0	52	0 45·5	0·26			
30	7 55·6	10·6	30	3 58·4	2·9	53	0 43·9	0·26			
40	7 45·0	10·3	40	3 55·5	2·9	54	0 42·3	0·25			
50	7 34·7	9·9	50	3 52·6	2·8	55	0 40·8	0·25			
7 0	7 24·8		14 0	3 49·8		56	0 39·3				

With respect to the refraction under different temperatures and at different states of the barometer the following theorems have been given, the 1st by Dr. Maskelyne, the 2d by Dr. Brinkley, viz.

$$\text{Ref.} = \frac{a}{29{\cdot}6} \times \tan(z - 3r) \times 57'' \times \frac{400}{350 + h}.$$

$$\text{Ref.} = \frac{a}{29{\cdot}6} \times \tan(z - 3{\cdot}2r)\ 56.''9 \times \frac{500}{450 + h}.$$

Where a = altitude of barometer in inches, h = height of Fahrenheit's thermometer in degrees, $r = 57''$ tan z.

Many curious and some whimsical effects of atmospherical refraction, have been noticed by ingenious men; for which see the article REFRACTION in Dr. Hutton's Dictionary, and the papers of Vince, Huddart, Lathom, &c. in the Philosophical Transactions. For more on the theory of atmospherical refraction, the reader may consult the treatises on astronomy by Vince, Gregory, Biot, and Woodhouse, and the Architecture Hydraulique of Prony.

REFRACTION OF ALTITUDE, is an arc of a vertical circle, by which the altitude of a star is increased by the refraction.

REFRACTION OF ASCENSION AND DESCENSION is an arc of the equator, by which the ascension and descension of a star, whether right or oblique, is increased or diminished by the refraction.

REFRACTION OF DECLINATION, is an arc of a circle of declination, by which the declination of a star is increased or diminished by refraction.

REFRACTION OF LATITUDE, is an arc of a circle of latitude, by which the latitude of a star is increased or diminished by the refraction.

REFRACTION OF LONGITUDE, is an arc of the ecliptic, by which the longitude of a star is in-

creased or diminished by means of the refraction.

Refraction (Double), a phenomenon manifested by several mineral substances, which have the singular property of soliciting a ray which penetrates them to divide itself into two parts following two different routes.

We owe the knowledge of this phenomenon to Erasmus Bartholinus, who, having looked at the image of a line through a transparent rhomboid of carbonate of lime (calcareous spar), observed that the image appeared double. The explanation of this singular effect has exercised the sagacity of many distinguished philosophers, at the head of whom are Huygens and Newton. But we cannot here detail their theories. An interesting account of them is given by M. Haüy in the 2d vol. of his Natural Philosophy, as well as of a theory devised by M. Haüy himself, which we think more satisfactory than any preceding hypothesis.

REFRA'CTIVE. *a.* (from *refract.*) Having the power of refraction (*Newton*).

REFRA'CTORINESS. *s.* (from *refractory.*) Sullen obstinacy (*Saunderson*).

REFRA'CTORY. *a.* (*refractoire,* French.) Obstinate; perverse; contumacious (*Bacon*).

REFRA'GABLE. *a.* (*refragabilis,* Latin.) Capable of confutation and conviction.

To REFRA'IN. *v. a.* (*refrener,* French.) To hold back; to keep from action (*Milton*).

To Refra'in. *v. n.* To forbear; to abstain; to spare (*Hooker*).

REFRANGIBILITY OF LIGHT, the disposition of rays to be refracted. The term is chiefly applied to the disposition of rays to produce different colours, according to their different degrees of refrangibility. See Chromatics, Colour, and Optics.

REFRA'NGIBLE. *a.* (*re* and *frango,* Lat.) That may be turned out of its course, in passing from one medium to another (*Locke*).

REFRENA'TION. *s.* (*re* and *fræno,* Lat.) The act of restraining.

To REFRE'SH. *v. a.* (*refraischer,* French.) 1. To recreate; to relieve after pain, fatigue, or want (*Shakspeare*). 2. To improve by new touches any thing impaired (*Dryden*). 3. To refrigerate; to cool (*Ecclus.*).

REFRE'SHER. *s.* (from *refresh.*) That which refreshes (*Thomson*).

REFRE'SHMENT. *s.* (from *refresh.*) 1. Relief after pain, want, or fatigue. 2. That which gives relief, as food, rest (*South*).

REFRI'GERANT. *a.* (*refrigerant,* French; from *refrigerate.*) Cooling; mitigating heat (*Wiseman*).

To REFRI'GERATE. *v. a.* (*refrigero,* Lat.) To cool (*Brown*).

REFRIGERA'TION. *s.* (*refrigeratio,* Lat.) The act of cooling; the state of being cooled (*Wilkie*).

REFRI'GERATIVE. Refrigeratory. *a.* (*refrigeratorius,* Latin.) Cooling; having the power to cool.

Refrigerative, in medicine, a remedy which refreshes the inward parts by cooling them; as clysters, ptisans, &c.

REFRIGERATORY, among chemical utensils, that part of a distilling apparatus in which the vapour is cooled and condensed. In the alembic it is situated at the top; in the common-still it constitutes the worm-tub.

REFRIGE'RIUM. *s.* (Latin.) Cool refreshment; refrigeration (*South*).

REFT. part. pret. of *reave.* 1. Deprived; taken away (*Ascham*). 2. (preterit of *reave.*) Took away (*Spenser*).

RE'FUGE. *s.* (*refuge,* Fr. *refugium,* Lat.) 1. Shelter from any danger or distress; protection (*Milton*). 2. That which gives shelter or protection (*Dryden*). 3. Expedient in distress (*Shakspeare*). 4. Expedient in general (*Wotton*).

To Re'fuge. *v. a.* (*refugier,* French.) To shelter; to protect (*Dryden*).

Refuge (Cities of), were places provided as asyla, for such as against their will should happen to kill a man. Of these cities there were three on each side Jordan: on this side were Kedish of Napthali, Hebron, and Schechem; beyond Jordon were Bezer, Golan, and Ramoth-Gilead. When any of the Hebrews, or strangers that dwelt in their country, happened to spill the blood of a man, they might retire thither to be out of the reach of the violent attempts of the relations of the deceased, and to prepare for their defence and justification before the judges. The manslayer underwent two trials; first before the judges of the city of refuge to which he had fled; and secondly before the judges of his own city. If found guilty, he was put to death with all the severity of the law. If he was acquitted, he was not immediately set at liberty; but, to inspire a degree of horror against even involuntary homicide, he was reconducted to the place of refuge, and obliged to continue there in a sort of banishment till the death of the high-priest. If, before this time, he ventured out, the revenger of blood might freely kill him; but after the high-priest's death he was at liberty to go where he pleased without molestation. It was necessary that the person who fled to any of the cities of refuge should understand some trade or calling, that he might not be burthensome to the inhabitants. The cities of refuge were required to be well supplied with water and necessary provisions. They were also to be of easy access, to have good roads leading to them, with commodious bridges where there was occasion. The width of the roads was to be 32 cubits or 48 feet at least. It was further required, that at all cross-ways direction-posts should be erected, with an inscription pointing out the road to the cities of refuge.

REFUGEE'. *s.* (*refugié,* French.) One who flies to shelter or protection (*Dryden*).

REFU'LGENCE. *s.* (from *refulgent.*) Splendour; brightness.

REFU'LGENT. *a.* (*refulgens,* Lat.) Bright; shining; glittering; splendid (*Dryden*).

To REFU'ND. *v. a.* (*refundo,* Lat.) 1. To pour back (*Ray*). 2. To repay what is received; to restore (*L'Estrange*).

REFU'SAL. *s.* (from *refuse.*) 1. The act of refusing; denial of any thing demanded

or solicited (*Rogers*). 2. The preemption; the right of having any thing before another; option (*Swift*).

To REFU'SE. *v. a.* (*refuser*, French.) 1. To deny what is solicited or required (*Shakspeare*). 2. To reject; to dismiss without a grant (*Shakspeare*).

To REFU'SE. *v. n.* Not to accept (*Milton*).

RE'FUSE. *a.* (from the verb.) Unworthy of reception; left when the rest is taken (*Fell*).

RE'FUSE. *s.* That which remains disregarded when the rest is taken (*Dryden*).

REFU'SER. *s.* (from *refuse*.) He who refuses.

REFU'TAL. *s.* (from *refute*.) Refutation.

REFU'TATION. *s.* (*refutatio*, Latin.) The act of refuting; the act of proving false or erroneous (*Bentley*).

To REFU'TE. *v. a.* (*refuto*, French.) To prove false or erroneous (*Milton*).

To REGAI'N. *v. a.* (*regagner*, French.) To recover; to gain anew (*Dryden*).

RE'GAL. *a.* (*regal*, French; *regalis*, Lat.) Royal; kingly (*Milton*).

RE'GAL. *s.* (*regale*, French.) A musical instrument (*Bacon*).

REGA'LE. *s.* (Latin.) The prerogative of monarchy.

To REGA'LE. *v. a.* (*regaler*, French.) To refresh; to entertain; to gratify (*Philips*).

REGALE'MENT. *s.* (*regalement*, French.) Refreshment; entertainment (*Philips*).

REGALIA, in law, the royal rights or prerogatives of a king.

These are reckoned by civilians to be six:—1. Power of judicature. 2. Power of life and death. 3. Power of war and peace. 4. Masterless goods, as waifs, estrays, &c. 5. Assessments. 6. Minting of money.

REGALIA is also used for the several parts of the apparatus of a coronation; as the sceptre with the cross; sceptre with the dove; St. Edward's staff; four several swords; the globe, and the orb with the cross, &c. used at the coronation of our kings.

REGALIA OF THE CHURCH are those rights and privileges which cathedrals, &c. enjoy by grants, and other concessions of kings.

REGA'LITY. *s.* (*regalis*, Latin.) Royalty; sovereignty; kingship (*Bacon*).

To REGA'RD. *v. a.* (*regarder*, French.) 1. To value; to attend to as worthy of notice (*Shaks.*). 2. To observe; to remark (*Shaks.*). 3. To mind as an object of grief or terrour. 4. To observe religiously (*Romans*). 5. To pay attention to (*Proverbs*). 6. To respect; to have relation to. 7. To look toward (*Sandys*).

REGA'RD. *s.* (*regard*, French.) 1. Attention as to a matter of importance (*Atter.*). 1. Respect; reverence (*Milton*). 3. Note; eminence (*Spenser*). 4. Respect; account (*Hooker*). 5. Relation; reference (*Watts*). 6. Look; aspect directed to another (*Dryden*). 7. Prospect; object of sight: not used (*Shakspeare*).

REGA'RDABLE. *a.* (from *regard*.) 1. Observable: not used (*Brown*). 2. Worthy of notice: not used (*Carew*).

REGARDANT, in heraldry, signifies looking behind; and is used for a lion, or other beast, with his face turned towards his tail. See HERALDRY.

REGA'RDER. *s.* One that regards.

REGA'RDFUL. *a.* (*regard* and *full*.) Attentive; taking notice of (*Hayward*).

REGA'RDFULLY. *ad.* 1. Attentively; heedfully. 2. Respectfully (*Shakspeare*).

REGA'RDLESLY. *ad.* (from *regardless*.) Without heed.

REGA'RDLESNESS. *s.* (from *regardless*.) Heedlessness; negligence; inattention.

REGA'RDLESS. *a.* (from *regard*.) Heedless; negligent; inattentive (*Spenser*).

REGATTA is a name given, at Venice, to a kind of exhibition on the water, in which the gondoliers contest for superiority in the art of rowing their gondolas.

A splendid entertainment, under this appellation, was exhibited on the Thames in 1775; and similar festivities have sometimes taken place upon our fresh-water lakes, especially Whittlesea Mere.

REGE INCONSULTO, in law, is a writ issued from the king to the judges, not to proceed in a cause which may prejudice the king, until he is advised. A *rege inconsulto* may be awarded, not only for the party to the plea, but upon suggestion of a stranger, on cause shewn that the king may be prejudiced by the proceeding, &c.

REGEL, or RIGEL, a fixed star of the first magnitude, in Orion's left foot. Its longitude, latitude, &c. see among the rest of the constellation ORION.

RE'GENCY. *s.* (from *regent*.) 1. Authority; government (*Grew*). 2. Vicarious government (*Temple*). 3. The district governed by a vicegerent (*Milton*). 4. Those to whom vicarious regality is intrusted.

To REGE'NERATE. *v. a.* (*regenero*, Lat.) 1. To reproduce; to produce anew (*Blackman*). 2. To make to be born anew; to renew by change of carnal nature to a christian life (*Addison*).

REGE'NERATE. *a.* (*regeneratus*, Latin.) 1. Reproduced (*Shakspeare*). 2. Born anew by grace to a christian life (*Milton*).

REGE'NERATENESS. *s.* (from *regenerate*.) The state of being regenerate.

REGENERA'TION. *s.* (*regeneration*, Fr.) New birth; birth by grace from carnal affections to a christian life. See CONVERSION.

REGENT, one who governs a kingdom during the minority or absence of the king. Before the revolution in France, the queen-mother had the regency of the kingdom during the minority of the king, under the title of queen-regent. In England, the methods of appointing this guardian or regent have been so various, and the duration of his power so uncertain, that from hence alone it may be collected that his office is unknown to the common law; and therefore (as sir Edward Coke says, 4 Inst. 58.) the surest way is to have him made by authority of the great council in parliament. The earl of Pembroke by his own authority assumed in very troublesome times the regency of

Henry III who was then only nine years old; but was declared of full age by the pope at 17, confirmed the great charter at 18, and took upon him the administration of the government at 20. A guardian and councils of regency were named for Edward III. by the parliament, which deposed his father; the young king being then 15, and not assuming the government till three years after. When Richard II. succeeded at the age of 11, the duke of Lancaster took upon him the management of the kingdom till the parliament met, which appointed a nominal council to assist him. Henry V. on his deathbed named a regent and a guardian for his infant son Henry VI. then nine months old: but the parliament altered his disposition, and appointed a protector and council, with a special limited authority. Both these princes remained in a state of pupilage till the age of 23. Edward V. at the age of 13, was recommended by his father to the care of the duke of Gloucester; who was declared protector by the privy-council. The statutes 25 Henry VIII. c. 12. and 28 Henry VIII. c. 7. provided, that the successor, if a male and under 18, or if a female and under 16, should be till such age in the governance of his or her natural mother, (if approved by the king,) and such other counsellors as his majesty should by will or otherwise appoint: and he accordingly appointed his 16 executors to have the government of his son Edward VI. and the kingdom, which executors elected the earl of Hartford protector. The statutes 24 Geo. II. c. 24. in case the crown should descend to any of the children of Frederic, late prince of Wales, under the age of 18, appointed the princess dowager;—and that of 5 Geo. III. c. 27. in case of a like descent to any of his present majesty's children, empowers the king to name either the queen or princess dowager, or any descendant of king George II. residing in this kingdom, to be guardian and regent till the successor attains such age, assisted by a council of regency; the powers of them all being expressly defined and set down in the several acts. During the present unhappy malady of the king of England, the prince of Wales has been regent of the British realms, first with very restricted powers, but now with the powers which usually characterize the royal functions in this country.

REGENT also signifies a professor of arts and sciences in a college, having pupils under his care; but it is generally restrained to the lower classes, as to rhetoric, logic, &c. those of philosophy being called professors. In the English universities it is applied to masters of arts under five years standing, and to doctors under two, as non-regent is to those above that standing.

RE'GENT. *a.* (*regent*, Fr. *regens*, Lat.) 1. Governing; ruling (*Hale*). 2. Exercising vicarious authority (*Milton*).

RE'GENTSHIP. *s.* (from *regent*.) 1. Power of governing. 2. Deputed authority (*Shakspeare*).

REGERMINA'TION. *s.* (*re* and *germination*.) The act of sprouting again.

REGGIO, a seaport of Naples, in Calabria Ulteriore, and an archbishop's see. The churches, convents, and many houses are built of stones from ancient edifices, and numerous inscriptions are to be met with on the walls of them. The environs produce the best silk in Calabria; and on the coast is found a species of muscle, that yields a kind of wool, of which gloves and stockings are made. Reggio was nearly destroyed by an earthquake in 1783. It is seated on the strait of Messina, 12 miles ESE. of Messina, and 95 S. by W. of Cosenza. Lon. 16. 0 E. Lat. 38. 4 N.

REGGIO, a city of Italy, capital of a duchy of the same name, included in that of Modena, and a bishop's see, with a strong citadel. In the cathedral are paintings by the greatest masters; and in the square is the statue of Brennus, chief of the Gauls. The principal trade is in silk. It was taken by prince Eugene in 1706, and by the king of Sardinia in 1742. In 1796, the inhabitants were the first Italians that renounced allegiance to their sovereign, and solicited the protection of the French. Reggio is the birthplace of the poet Ariosto. It is seated in a fertile country, on the river Tessone, 15 miles N.W. of Modena, and 80 S.E. of Milan. Lon. 11. 5 E. Lat. 44. 43 N.

REGHEBIL, a town of Negroland, in the country of Wangara, situate on a lake at the influx of a branch of the Niger, 240 miles E. by S. of Ghanara. Lon. 19. 10 E. Lat. 13. 20 N.

RE'GIBLE. *a.* Governable.

RE'GICIDE. *s.* (*regicida*, *regicidum*, Lat.) 1. Murderer of his king (*Dryden*). 2. Murder of his king (*Decay of Piety*).

REGILLÆ, a town in the country of the Sabines, about 20 miles from Rome, celebrated for a battle fought there, A. U. C. 258, between 24,000 Romans, and 40,000 Etrurians, who were headed by the Tarquins. The Romans obtained the victory, and scarce 10,000 of the enemy escaped from the field of battle.

REGIMEN, the regulation of diet, and in a more general sense, of all the non-naturals, with a view to preserve or restore health. See MATERIA MEDICA, DIET, &c.

REGIMEN, in grammar, that part of syntax or construction which regulates the dependancy of words, and the alterations which one occasions in another.

REGIMENT, a term applied to any body of troops: which, if cavalry, consists of one or more squadrons, commanded by a colonel; and if infantry, of one or more battalions, each commanded in the same manner. The squadrons in cavalry regiments are divided, sometimes into six, and sometimes into nine troops. The battalions of British infantry are generally divided into ten companies, two of which are called the flanks; one on the right consisting of grenadiers, and another on the left formed of light troops. There is not, however, any established rule on this head; as both cavalry and infantry regiments differ according to the exigencies of service in time of war, or the principles of economy in time of peace. We are humbly of

opinion, that every regiment of foot should consist of 2400 men, making three battalions of 800 each. The German regiments frequently consist of 2000 men; and the regiment of Picardy in the old French service had 6000. The French have made a distinction between the commanding officer of a regiment of cavalry, and the commanding officer of a regiment of infantry: the former was styled mestre de camp; the latter colonel, as with us.

REGIME'NTAL. *a.* (from *regiment.*) Belonging to a regiment; military.

REGINA PRATI. See ULMARIA.

REGIOMONTANUS. See MULLER.

RE'GION. *s.* (*region*, French; *regio*, Lat.) 1. Tract of land; country; tract of space (*Shakspeare*). 2. Part of the body (*Shakspeare*). 3. Place; rank (*Shakspeare*).

REGIS (Peter Sylvain), a French philosopher, and great propagator of Cartesianism, was born in Agenois, 1632. He cultivated the languages and philosophy under the Jesuits at Cahors, and afterwards divinity in the university of that town, being designed for the church. He made so uncommon a progress, that at the end of four years he was offered a doctor's degree without the usual charges; but he did not think it became him to accept of it till he had studied also in the Sorbonne at Paris. He went thither, but was soon disgusted with theology; and as the philosophy of Des Cartes began at that time to make a noise through the lectures of Rohault, he conceived a taste for it, and gave himself up entirely to it. He frequented these lectures; and becoming an adept, went to Toulouse in 1665, and read lectures in it himself. Having fine parts, a clear and fluent manner, and a happy way of making himself understood, he drew all sorts of people; the magistrates, the learned, the ecclesiastics, and the very women, who now all affected to abjure the ancient philosophy. In 1680 he returned to Paris; where the concourse about him was such, that the sticklers for Peripateticism began to be alarmed. They applied to the archbishop of Paris, who thought it expedient, in the name of the king, to put a stop to the lectures; which accordingly were discontinued for several months. The whole life of Regis was spent in propagating the new philosophy. In 1690 he published a formal system of it, containing logic, metaphysics, physics, and morals, in 3 vols. 4to, and written in French. It was reprinted the year after at Amsterdam, with the addition of a discourse upon ancient and modern philosophy. He wrote afterwards several pieces in defence of his system; in which he had disputes with M. Huet, Du Hamel, Malebranche, and others. His works, though abounding with ingenuity and learning, have been disregarded, in consequence of the great discoveries and advancement in philosophic knowledge that have been since made. He died in 1707. He had been chosen member of the academy of sciences in 1699.

REGIS (St.), a town of Lower Canada, situate on the boundary line that separates Canada from the United States, and on a river of its name, at its junction with the St. Lawrence; 50 miles S.W. of Montreal. Lon. 74. 10 W. Lat. 45. 0 N.

REGISTER, a public book in which is entered and recorded memoirs, acts, and minutes to be had recourse to occasionally, for knowing and proving matters of fact. Of these there are several kinds; as, 1. Registers of deeds in Yorkshire and Middlesex, in which are registered all deeds, conveyances, wills, &c. that affect any lands or tenements in those counties, which are otherwise void against any subsequent purchasers or mortgagees, &c.; but this does not extend to any copyhold estate, nor to leases at a rack rent, or where they do not exceed twenty-one years. The registered memorials must be engrossed on parchment, under the hand and seal of some of the grantors or grantees, attested by witnesses who are to prove the signing or sealing of them, and the execution of the deed. But these registers, which are confined to two counties, are in Scotland general, by which the laws of North Britain are rendered very easy and regular. Of these there are two kinds: the one general, fixed at Edinburgh, under the direction of the lord register; and the other is kept in the several shires, stewartries, and regalities, the clerks of which are obliged to transmit the registers of their respective courts to the general register. No man in Scotland can have a right to any estate, but it must become registered within forty days of his becoming seised thereof; by which means all secret conveyances are cut off. 2. Parish registers are books in which are registered the baptisms, marriages, and burials of each parish.

Among dissenters who admit of infant baptism, each minister is supposed to keep a register of the several children baptized by him. But as these are frequently lost, by the succession of new ministers to the same congregation; or at best do not give an account of the date of the births, which may have happened many weeks or months before baptism, it is now almost generally the custom among dissenters of all denominations to register the births of their children at the Library in Red-cross Street, Cripplegate, for which the charge is sixpence. This register is admitted in the courts of law.

REGISTER, is also used for the clerk or keeper of a register. Of these we have several, denominated from the registers they keep; as Register of the High Court of Delegates; Register of the Arches Court of Canterbury; Register of the Court of Admiralty; Register of the Prerogative Court; Register of the Garter, &c.

REGISTER SHIPS, in commerce, are vessels which obtain a permission either from the king of Spain, or the council of the Indies, to traffic in the ports of the Spanish West Indies; which are thus called from their being registered before they set sail from Cadiz, for Buenos Ayres. Each of these permissions costs 30,000 pieces of eight, and by the tenor of the cedula, or permit, they are not to exceed 300 tons; but there is such a good understanding between the merchants and the council of the Indies, that ships

of 5 or 600 tons frequently pass unnoted; and though the quantity and quality of the merchandizes on board are always expressed, yet, by means of presents, the officers, both in Spain and the Indies, allow them to load and unload vastly more than the permission expresses.

REGISTER, in printing, is disposing the forms on the press so as that the lines and pages printed on one side of the sheet fall exactly on those of the other.

REGISTER, among letter-founders, is one of the inner parts of the mould in which the printing types are cast. Its use is to direct the joining the mould justly together again, after opening it to take out the new cast letter.

REGISTERS, in chemistry, are holes, or chinks with stopples, contrived in the sides of furnaces, to regulate the fire; that is, to make the heat more intense, or remiss, by opening them to let in the air, or keeping them close to exclude it.

To RE'GISTER. *v. a.* (*registrer*, Fr.) 1. To record; to preserve from oblivion by authentic accounts (*Addison*). 2. To enroll; to set down in a list (*Milton*).

REGISTRAR, an officer in the English universities, who has the keeping of all the public records.

RE'GISTRY. *s.* (from *register*.) 1. The act of inserting in the register (*Graunt*). 2. The place where the register is kept. 3. A series of facts recorded (*Temple*).

REGIUM. Now REGGIO.

REGLE DE L'OCTAVE. (French.) Rule of the octave. An expression applied by the old writers on harmony to the rule for accompanying the eight notes of a key: which they sometimes also call *quadreble syghte*.

RE'GLEMENT. *s.* (French.) Regulation (*Bacon*).

RE'GLET. *s.* (*reglette*, French.) Ledge of wood exactly planed, by which printers separate their lines in pages widely printed.

REGNARD (John Francis), one of the best French comic writers after Moliere, was born at Paris in 1647. He had scarcely finished his studies, when an ardent passion for travelling carried him over the greatest part of Europe. When he settled in his own country, he was made a treasurer of France, and lieutenant of the waters and forests: he wrote a great many comedies; and, though naturally of a gay genius, died of chagrin in the 52d year of his age. His works, consisting of comedies and travels, were printed at Rouen, in 5 vols. 12mo, 1732.

REGNIER (Mathurin), the first French poet who succeeded in satire, was born at Chartres in 1573. He was brought up to the church, a place for which his debaucheries rendered him very unsuitable; and these by his own confession were so excessive, that at 30 he had all the infirmities of age. Yet he obtained a canonry in the church of Chartres, with other benefices; and died in 1613. There is a neat Elzevir edition of his works, 12mo, 1652, Leyden; but the most elegant is that with notes by M. Brossette, 4to, 1729, London.

REGNIER DES MARETS (Seraphin), a French poet, born at Paris in 1632. He distinguished himself early by his poetical talents, and in 1684 was made perpetual secretary to the French academy on the death of Mezeray: it was he who drew up all those papers in the name of the academy against Furetiere: the king gave him the priory of Grammont, and he had also an abbey. He died in 1713, and his works are, French, Italian, Spanish, and Latin poems, 2 vols. a French grammar; and an Italian translation of Anacreon's odes, with some other translations.

RE'GNANT. *a.* (French.) 1. Reigning; having regal authority (*Wotton*). 2. Predominant; having power (*Waller*).

To REGO'RGE. *v. a.* (*re* and *gorge*.) 1. To vomit up; to throw back (*Hayward*). 2. To swallow eagerly (*Milton*). 3. (*regorger*, Fr.) To swallow back (*Dryden*).

To REGRA'FT. *v. a.* (*regreffer*, French.) To graft again (*Bacon*).

To REGRA'NT. *v. a.* (*re* and *grant*.) To grant back (*Ayliffe*).

To REGRA'TE. *v. a.* 1. To offend; to shock (*Derham*). 2. (*regratter*, Fr.) To engross; to forestal (*Spenser*).

REGRATOR, one who buys and sells any wares or victuals in the same market or fair: and regrators are particularly described to be those who buy, or get into their hands, in fairs or markets, any grain, fish, butter, cheese, sheep, lambs, calves, swine, pigs, geese, capons, hens, chickens, pigeons, conies, or other dead victuals whatsoever, brought to a fair or market to be sold there, and do sell the same again in the same fair, market, or place, or in some other within four miles thereof. Regrating is a kind of huckstry, by which victuals are made dearer; for every seller will gain something, which must of consequence enhance the price. And in ancient times, both the engrosser and regrator were comprehended under the word forestaller. Regrators are punishable by loss and forfeiture of goods, and imprisonment, according to the first, second, or third offence, &c.

To REGREE'T. *v. a.* (*re* and *greet*.) To resalute; to greet a second time (*Shakspeare*).

REGREE'T. *s.* Return or exchange of salutation: not in use (*Shakspeare*).

REGRE'SS. *s.* (*regressus*, Latin.) Passage back; power of passing back (*Burnet*).

To REGRE'SS. *v. a.* (*regressus*, Latin.) To go back; to return (*Brown*).

REGRE'SSION. *s.* (*regressus*, Latin.) The act of returning or going back (*Brown*).

REGRE'T. *s.* (*regret*, Fr. *regretto*, Italian.) 1. Vexation at something past; bitterness of reflection (*South*). 2. Grief; sorrow (*Clarendon*). 3. Dislike; aversion: not proper (*Decay of Piety*).

To REGRE'T. *v. a.* (*regretter*, French.) To repent; to grieve at (*Boyle*).

REGUE'RDON. *s.* (*re* and *guerdon*.) Reward; recompence: obsolete (*Shakspeare*).

To REGUE'RDON. *v. a.* To reward (*Shak.*).

RE'GULAR. *a.* (*regularis*, Lat.) 1. Agreeable to rule; consistent with the mode prescribed (*Addison*). 2. Governed by strict regulations (*Pope*). 3. Instituted or initiated according to established forms or discipline. 4. Methodical; orderly (*Law*).

REGULAR BODY, called also *platonic body*, is a body or solid comprehended by like, equal, and regular plane figures, and whose solid angles are all equal.

The plane figures by which the solid is contained are the faces of the solid; and the sides of the plane figures are the edges, or linear sides of the solid.

There are only five regular solids, viz.

The tetraedron, or regular triangular pyramid, having four triangular faces;

The hexaedron, or cube, having six square faces;

The octaedron, having eight triangular faces;

The dodecaedron, having twelve pentagonal faces;

The icosaedron, having twenty triangular faces.

Besides these five, there can be no other regular bodies in nature. See BODY.

PROB. 1. *To construct or form the regular solids.*—See the method of describing these figures under the article BODY.

2. *To find either the surface or the solid content of any of the regular bodies.*—Multiply the proper tabular area or surface (taken from the following table) by the square of the linear edge of the solid, for the superficies. And

Multiply the tabular solidity, in the last column of the table, by the cube of the linear edge, for the solid content.

Surfaces and solidities of regular bodies, the side being unity or 1.

No. of sides.	Name.	Surface.	Solidity.
4	Tetraedron	1·7320508	0·1178513
6	Hexaedron	6·0000000	1·0000000
8	Octaedron	3·4641016	0·4714045
12	Dodecaedron	20·6457788	7·6631189
20	Icosaedron	8·6602540	2·1816950

3. The diameter of a sphere being given, to find the side of any of the platonic bodies, that may be either inscribed in the sphere, or circumscribed about the sphere, or that is equal to the sphere.

Multiply the given diameter of the sphere by the proper or corresponding number, in the following table, answering to the thing sought, and the product will be the side of the platonic body required.

The diam. of a sphere being 1, the side of a	That may be inscribed in the sphere, is	That may be circumscribed about the sphere, is	That is equal to the sphere, is
Tetraedron	0·816497	2·44948	1·64417
Hexaedron	0·577350	1·00000	0·88610
Octaedron	0·707107	1·22474	1·03576
Dodecaedron	0·525731	0·66158	0·62153
Icosaedron	0·356822	0·44903	0·40883

4. The side of any of the five platonic bodies being given, to find the diameter of a sphere, that may either be inscribed in that body, or circumscribed about it, or that is equal to it.—As the respective number in the table above, under the title, *inscribed, circumscribed,* or *equal,* is to 1, so is the side of the given platonic body, to the diameter of its inscribed, circumscribed, or equal sphere.

5. The side of any one of the five platonic bodies being given; to find the side of any of the other four bodies, that may be equal in solidity to that of the given body.—As the number under the title *equal* in the last column of the table above, against the given platonic body, is to the number under the same title, against the body whose side is sought, so is the side of the given body, to the side of the required one. (*Hutton's Mens.*)

REGULAR COROL, in botany, applied to the corol. Æqualis figura, magnitudine et proportione partium. Equal in the figure, size and proportion of the parts: as in privet, lilac, jasmin, &c.

REGULAR GOUT. See ARTHRITIS.

RE'GULAR. *s.* (*regulier*, French.) In the Romish church, one that professes and follows a certain rule of life, and observes the three vows of poverty, chastity, and obedience (*Ayliffe*).

REGULA'RITY. *s.* (*regularité*, French.) 1. Agreeableness to rule. 2. Method; certain order (*Grew*).

RE'GULARLY. *ad.* (from *regular.*) In a manner concordant to rule; exactly (*Prior*).

To RE'GULATE. *v. a.* (*regula*, Lat.) 1. To adjust by rule or method (*Locke*). 2. To direct (*Wiseman*).

REGULA'TION. *s.* (from *regulate.*) 1. The act of regulating (*Ray*). 2. Method; the effect of being regulated.

REGULA'TOR. *s.* (from *regulate.*) 1. One that regulates (*Grew*). 2. That part of a machine which makes the motion equable.

REGULBIUM, or REGULVIUM, (Notitia Imperii); mentioned nowhere else more early: a town of the Cantii, in Britain. Now Reculver, a village on the coast, near the island

of Thanet, towards the Thames, to the north of Canterbury. (*Camden*).

REGULUS (M. Atilius), a consul during the first Punic war. He reduced Brundusium; and in his second consulship took 64, and sunk 30 gallies of the Carthaginian fleet, on the coasts of Sicily. Afterwards he landed in Africa, where he took 200 places of consequence on the coast. The Carthaginians sued for peace, but the conqueror refused to grant it, and soon after he was defeated in a battle by Xanthippus, and 30,000 of his men were left on the field of battle, and 15,000 taken prisoners. Regulus was in the number of the captives, and he was carried in triumph to Carthage. He was sent by the enemy to Rome, to propose an exchange of prisoners; and if his commission was unsuccessful, he was bound by the most solemn oaths to return to Carthage, without delay. When he came to Rome, Regulus dissuaded his countrymen from accepting the terms which the enemy proposed, and when his opinion had had due influence on the senate, Regulus retired to Carthage agreeable to his engagements. The Carthaginians punished him with the greatest severity. His eyebrows were cut, and he was exposed for some days to the excessive heat of the meridian sun, and afterwards confined in a barrel, whose sides were every where filled with large iron spikes, till he died in the greatest agonies. Regulus died about 251 years before Christ.

REGULUS. (*regulus*, dim. of *rex*, a king; so called because the alchemists expected to find gold, the king of metals, collected at the bottom of the crucible after fusion.) A name given by the alchemists to metallic matters when separated from other substances by fusion; as, regulus of antimony, regulus of arsenic, &c.

It is, however, a term applied by some metallurgists to metals of every kind when reduced to a state of purity: though it is still chiefly applied by way of distinction to those which, like antimony, arsenic, and cobalt, have one common name for the metal, and the ore or sulphuret; the name having been made use of to distinguish the last before the pure metal was known.

REGULUS OF ANTIMONY. The pure semi-metal antimony. See ANTIMONY.

REGULUS OF ARSENIC. Pure arsenic. See ARSENIC, and so of other metals.

REGULUS, in astronomy, is a star of the first magnitude, in the constellation Leo; called also, from its situation, Cor Leonis, or the Lion's Heart; by the Arabs, Alhabor; and by the Chaldeans, Kalbeleced, or Kalbeleceid; from an opinion of its influencing the affairs of the heavens; as is observed by Theon.

The right ascension of regulus (for Jan. 1, 1810) was 9h. 58m. 14s. annual diff. 3·20 sec. the declination 12° 53′ 40″ N. an. diff. 16″·9.

To REGU'RGITATE. *v. a.* (*re* and *gurges*, Latin.) To throw back; to pour back (*Bentley*).

To REGU'RGITATE. *v. n.* To be poured back (*Harvey*).

REGURGITATION. *s.* (from *regurgitate.*) Resorption; the act of swallowing back (*Sharp*).

To REHEA'R. *v. a.* (*re* and *hear.*) To hear again (*Addison*).

REHEA'RSAL. *s.* (from *rehearse.*) 1. Repetition; recital (*South*). 2. The recital of any thing previous to public exhibition (*Dryden*).

To REHEA'RSE. *v. a.* (from *rehear.*) 1. To repeat; to recite (*Swift*). 2. To relate; to tell (*Dryden*). 3. To recite previously to public exhibition.

REICHELIA, in botany, a genus of the class pentandria, order trigynia. Calyx five-parted; corol campanulate, five-cleft; capsule three-celled, opening transversely all round; seeds adhering to a very large receptacle. One species: a native of Guinea, with blue axillary flowers, clustered, each on a short peduncle.

REICHENAU, an island of Suabia, in the Zeller See, or lower lake of Constance, three miles long and one broad. It abounds with vines and other fruit-trees, and lately had a rich abbey, of which the bishop of Constance was abbot. It is four miles W. of Constance.

REICHENAU, a town of Swisserland, in the country of the Grisons, seated in a rich and fertile valley, at the conflux of the two branches that form the Rhine. Here are two curious bridges. One of these is thrown across the lower branch of the Rhine, and is 105 feet in length. The other, built across the Rhine, below the point of union, is a wooden one, of a single arch, the span of which is 220 feet. Reichenau is seven miles S.W. of Coire.

REICHENBACH, a river of Swisserland, which has its source at the foot of Mount Wetterhorn, and rolls its numerous cataracts down the steep sides of Mount Sheidec, till it unites with the Aar, near Meyringen. It conveys into the Aar the gold dust that is found in the bed of that river.

REICHENFELLS, a town of Germany, in the duchy of Carinthia, 24 miles N.E. of Clagenfurt, and 24 E. of Muhrau. Lon. 14. 4 E. Lat. 47. 9 N.

REICHENHALL, a town of Upper Bavaria, on the Sala, with a rich salt spring, nine miles S.W. of Saltzburg, and 64 S.W. of Munich. Lon. 13. 2 E. Lat. 47. 23 N.

REICHENSTEIN, a town of Silesia, famous for the silver mines in its neighbourhood. It is 12 miles W. of Grotskaw.

REICHSHOFEN, a town of France, in the department of Lower Rhine, with a castle, in the neighbourhood of Haguenau.

REID (Thomas) a distinguished moral and metaphysical writer, was the son of the Rev. Lewis Reid, minister of the parish of Strachan, in the county of Kincardine, North Britain. He was born at the parsonage house of Strachan in April 1710, and received the rudiments of his education at the parish school of Kincardine-oniel; and was removed from thence to the Marischal college, Aberdeen, when not more than twelve years of age.

After the usual course of four years employed in the study of Latin, Greek, mathematics, and philosophy, he probably took his degree of M. A. which at that period, and for a long time subsequent to it, was the universal practice in the university of Aberdeen, and then commenced the study of theology. In due time he was licensed to preach the gospel according to the forms of the church of Scotland; but continued to reside for some years in Aberdeen, cultivating his favourite science, mathematics.

The mathematical chair in the Marischal college was then filled by Mr. John Stuart, a man of great eminence in his profession; but who, like many other profound mathematicians, was not happy in his mode of communicating science, at least to the duller part of his pupils. Mr. Reid occasionally read lectures for the professor, and became very popular with his fellow pupils. He could not however spend his life in the study of mathematics, and in reading barren lectures for other men. He had been educated for the church; and it was in the church only that he had the prospect of gaining a livelihood. He was accordingly presented, we know not in what year, to the church of New Machar in Aberdeenshire, at a time when the good people of Scotland were very far from being reconciled to the rights of patronage; and the consequence was, that his settlement met with much popular opposition. Even a little riot took place in the church at his ordination; but he soon gained the affections of his flock by his good sense, his acknowledged worth, and his unwearied attention to all their wants, which he was ever ready to relieve to the utmost extent of his abilities. So deeply rooted indeed was their regard for him at last, that though it is now half a century since his relation to the parish of New Machar ceased, his memory continues to be revered in that parish even at the present day.

In the year 1751, about the beginning of the session or annual term, one of the professors of philosophy in King's college, Aberdeen, died; and the late Dr. John Gregory, then professor of medicine, with the Rev. Dr. Macleod, the present sub-principal of King's college, were deputed to visit Mr. Reid, and to request his immediate acceptance of the vacant professorship. He yielded to the request, not without some hesitation, and was admitted professor of philosophy on the 22d of November.

He was now in the very situation for which nature seemed to have intended him. He had not only an opportunity, but it was his duty to cultivate the science to which his attachment was so strong; and the duties of his office made him turn his attention more closely than he had hitherto done to another science, in which he was destined to make a more conspicuous figure than he ever made even in his favourite mathematics.

It was during his professorship in the university of Aberdeen that he wrote his Essay on Quantity, which was published in the 45th volume of the Philosophical Transactions, and is perhaps the finest specimen of metaphysical mathematics, if we may use such an expression, that is extant in our own or in any other language. See QUANTITY. It was during the same period that he published his Enquiry into the Human Mind on the Principles of Common Sense; a work of unquestionable merit, which has contributed more than any other work whatever to give a rational turn to metaphysical speculations. It was about this period that the degree of D.D. was conferred upon him by his mother-college.

The well-earned fame of Dr. Reid attracted the attention of the university of Glasgow to him as the fittest person to succeed the celebrated Dr. Adam Smith; and he was admitted professor of moral philosophy in that university on the 11th of June, 1764. There his attention was not distracted by a multitude of sciences, which it was his duty to teach; and he had leisure to improve his metaphysical system, though he continued through life to amuse himself occasionally with mathematical speculations.

In the year 1773 appeared, in lord Kames's Sketches of the History of Man, A brief Account of Aristotle's Logic; with remarks by Dr. Reid. It would seem that he had entered upon this task rather reluctantly, and merely in compliance with the solicitations of his friend, the author of the Sketches.

But when it is known that the late Dr. Doig of Stirling, to whom Greek was as familiar as his mother tongue, and an equally learned doctor of Oxford, who has been reading Aristotle ever since he was fourteen years of age, agreed in opinion, that a more accurate view of his logic could not be given in the same compass than had been given by Dr. Reid, we may surely affirm, with some degree of confidence, that this small work adds much to the fame of its author.

Though Dr. Reid's health continued good, and his mental faculties unimpaired, till a very short time before his death, he ceased for some years to read lectures from his professorial chair, employing that time in preparations for eternity, and in fitting his lectures for the press. These were published in two volumes 4to: the first in 1785, under the title of Essays on the Intellectual Powers of Man, dedicated to his friends Dr. Gregory and professor Stewart, both of the university of Edinburgh; and the second in 1788, under the title of Essays on the Active Powers of Man, without any dedication or preface. He continued to enjoy the fame acquired by this work, as well as the affection of his friends, and the reverence of the public for eight years, dying at Glasgow in the end of September, or the beginning of October, 1796, in the 87th year of his age. He had been married, and he left behind him one daughter.

To do justice to the biography of such a man as this, we should here attempt to draw his intellectual character, and to appreciate the merits of his works; but to perform this task

in a manner at all worthy of him, or we hope of ourselves, would require more room than our limits permit us to allot to any article of the kind; and our readers will be pleased to learn, that they may confidently expect an account of his life, with a critique on his works, by a man better qualified to do justice to both, than the writer of this short sketch pretends to be. His works are in the hands of the speculative public; and by that public will be duly valued, as long as sound sense shall be preferred to impious jargon. How long that may be, God only knows; but if any thing can guard the minds of our youth against that sophistry of which the object is to attribute real agency to material fluids, and to represent the elective attractions of chemistry as perfectly similar to human volitions, it will be the unbiassed study of Dr. Reid's Essays on the Intellectual and Active Powers of Man. They will there find metaphysics divested of mystery, and the profoundest speculations rendered intelligible by the constant use of words in one determined sense.

Candour however obliges us to acknowledge, that he has advanced some doctrines which we cannot admit as true. Though not in general partial to Locke, he has adopted his notions respecting our power of abstraction, with hardly any other variation than the substituting of the term *conceptions* for Locke's favourite phrase *ideas*. He has likewise endeavoured to prove, that we may distinctly conceive what cannot possibly exist. These mistakes, however, for such they appear to us, are infinitely more than counterbalanced by his clear, accurate, and satisfactory disquisitions on our notions of active power. Had Dr. Reid never written a sentence but the essay which treats of this delicate and important subject, he would have been entitled to a place in the very first rank of useful metaphysicians; for, previous to the appearance of his works, we had nothing written directly on power but contradictory and unintelligible jargon. We recommend the serious perusal of this essay, the first in his second volume, to such of our readers as fancy that they distinctly conceive the powers of chemical agents, and that intelligence and volition may result from mechanical organization, or any combination whatever of matter and motion.

To REJE'CT. *v. a.* (*rejectus*, Lat.) 1. To dismiss without compliance with proposal or acceptance of offer (*Knolles*). 2. To cast off; to make an abject (*Isaiah*). 3. To refuse; not to accept (*Locke*). 4. To throw aside (*Beattie*).

REJE'CTION, *s.* (*rejectio*, Lat.) The act of casting off or throwing aside (*Bacon*).

REI'GLE. *s.* (*reigle*, Fr.) A hollow cut to guide any thing (*Carew*).

To REIGN. *v. a.* (*regno*, Lat. *regner*, Fr.) 1. To enjoy or exercise sovereign authority. 2. To be predominant; to prevail (*Bacon*). 3. To obtain power or dominion (*Romans*).

REIGN. *s.* (*regne*, Fr. *regnum*, Latin.) 1. Royal authority; sovereignty (*Pope*). 2. Time of a king's government (*Thomson*). 3. Kingdom; dominions (*Pope*). 4. Power; influence (*Chapman*).

To REIMBO'DY. *v. n.* (*re* and *imbody*.) To imbody again (*Boyle*).

To REIMBU'RSE. *v. a.* (*re*, *in*, and *bourse*, Fr. a purse.) To pay; to repair loss or expence by an equivalent (*Swift*).

REIMBU'RSEMENT. *s.* (from *reimburse*.) Reparation or repayment (*Ayliffe*).

To REIMPRE'GNATE. *v. a.* (*re* and *impregnate*.) To impregnate anew (*Brown*).

REIMPRE'SSION. *s.* (*re* and *impression*.) A second or repeated impression.

REIN. *s.* (*resnes*, Fr.) 1. The part of the bridle which extends from the horse's head to the driver or rider's hand. 2. Used as an instrument of government, or for government (*Shakspeare*). 3. *To give the* REINS. To give license (*Milton*).

To REIN. *v. a.* (from the noun.) 1. To govern by a bridle (*Milton*). 2. To restrain; to control (*Shakspeare*).

REIN-DEER. See CERVUS.

REINS. *s.* (*renes*, Lat. *rein*, Fr.) The kidneys; the lower part of the back (*Job*).

To REINSE'RT. *v. a.* (*re* and *insert*.) To insert a second time.

To REINSPI'RE. *v. a.* (*re* and *inspire*.) To inspire anew (*Dryden*).

To REINSTA'LL. *v. a.* (*re* and *install*.) 1. To seat again (*Milton*). 2. To put again in possession (*Shakspeare*).

To REINSTA'TE. *v. a.* (*re* and *instate*.) To put again in possession (*Addison*).

To REI'NTEGRATE. *v. a.* (*reinteger*, French.) To renew with regard to any state or quality; to repair; to restore (*Bacon*).

To REINVE'ST. *v. a.* (*re* and *invest*). To invest anew.

To REJOI'CE. *v. n.* (*rejouer*, Fr.) To be glad; to joy; to exult (*Milton*).

To REJOI'CE. *v. a.* To exhilarate; to gladden; to make joyful; to glad (*Prior*).

REJOI'CER. *s.* (from *rejoice*.) One that rejoices (*Taylor*).

To REJOI'N. *v. a.* (*rejoindre*, Fr.) 1. To join again (*Brown*). 2. To meet one again (*Pope*).

To REJOI'N. *v. n.* To answer an answer.

REJOINDER, in law, the defendant's answer to the plaintiff's replication. The order of the court of chancery is thus: first, the defendant puts in an answer or plea to the plaintiff's bill, which is sometimes also called an exception; the plaintiff's answer to this is called a replication; and the defendant's answer to that, a rejoinder.

The plaintiff may answer the rejoinder by a sur-rejoinder; upon which the defendant may rebut; and the plaintiff may answer him by a sur-rebutter: which pleas, replications, rejoinders, sur-rejoinders, rebutters, and sur-rebutters, answer to the exceptio, duplicatio, triplicatio, and quadruplicatio of the Roman laws. See PLEADING.

REISENBURG, a town of Prussia, in the province of Oberland, formerly the residence

of the bishops of Pomerania. Near it is an ancient castle. It is 78 miles S.W. of Konigsberg. Lon. 20. 5 E. Lat. 53. 52 N.

REISKE (John James), an eminent critic, born in the duchy of Anhalt, 1706. He studied at Leipsic, and went to Leyden, where he resided eight years, till the severity of his remarks on Burman's Petronius excited a cabal against him. In 1758 he was appointed rector of the academy of Leipsic, and his classical reputation was increased by his marriage, in 1764, with Ernestina Christina Muller, a lady of great talents, well qualified to assist and cheer his literary labors. He died 1774. He published animadversiones in auctores Græcos, 5 vols. a valuable work—an edition of the Greek orators, 12 vols. 8vo. completed by his widow—Dionysius of Halicarnassus, 7 vols—Plutarch's works, in 9 vols.—Theocritus, &c.

REJO'LT. *s.* (*rejailler*, French.) Shock; succussion (*South*).

REIT. *s.* Sedge, or sea-weed (*Bailey*).

To REI'TERATE. *v. a.* (*reiterer*, Fr.) To repeat again and again (*Smalridge*).

REITERATION. *s.* (*reiteration*, Fr.) Repetition (*Boyle*).

To REJU'DGE. *v. a.* (*re* and *judge*.) To reexamine; to review; to recall to a new trial (*Pope*).

To REKI'NDLE. *v. a.* (*re* and *kindle*.) To set on fire again (*Cheyne*).

To RELA'PSE. *v. n.* (*relapsus*, Lat.) 1. To slip back; to slide or fall back. 2. To fall back into vice or errour (*Taylor*). 3. To fall back from a state of recovery to sickness (*Wiseman*).

RELA'PSE. *s.* (from the verb.) 1. Fall into vice or errour once forsaken (*Milton*). 2. Regression from a state of recovery to sickness (*Spenser*). 3. Return to any state (*Shakspeare*).

To RELA'TE. *v. a.* (*relatus*, Lat.) 1. To tell; to recite (*Dryden*). 2. To vent by words (*Bacon*). 3. To ally by kindred (*Pope*). 4. To bring back; to restore (*Spenser*).

To RELA'TE. *v. n.* To have reference; to have respect (*Locke*).

RELA'TER. *s.* (from *relate*.) Teller; narrator; historian (*Brown*).

RELATION. *s.* (*relation*, Fr.) 1. Manner of belonging to any person or thing. 2. Respect; reference; regard (*Locke*). 3. Connexion between one thing and another (*Beattie*). 4. Kindred; alliance of kin (*Dryden*). 5. Person related by birth or marriage; kinsman; kinswoman (*Swift*). 6. Narrative; tale; account; narration (*Dennis*).

RELATION, *relatio*, in philosophy, the mutual respect of two things; or what each is with regard to the other.

The word is formed *a referendo*; relation consisting in this, that one thing is referred to another; whence it is also called respect, habitude, and comparison.

The idea of relation we acquire, when the mind so considers any thing, that it doth, as it were, bring it to, and set it by, another, and carry its view from the one to the other. Hence the denominations given to things intimating this respect, are called relatives; and the things so brought together, are said to be related.

Thus, when I call Caius husband, or this wall whiter, I intimate some other person or thing in both cases, with which I compare him or it. Hence the wall is called by the schoolmen the subject; the thing it exceeds in whiteness, the term; and the whiteness, the foundation of the relation.

Relation may be considered two ways; either on the part of the mind referring one thing to another; in which sense relation is only a mode or affection of the mind, whereby we make such comparison: or on the part of the things referred, which being no other than ideas, relation, in this sense, is only a new idea resulting or arising in the mind upon considering of two other ideas. So that relation, take it as you will, is only in the mind, and has nothing to do with the things themselves.

Any of our ideas, Mr. Locke observes, may be the foundation of relation. Though, where languages have failed to give correlative names, the relation is not easily taken notice of; as in concubine, which is a relative name, as well as wife.

There is, in effect, no idea but is capable of an infinite number of relations: thus, one single man may at once sustain the relations of father, brother, son, husband, friend, subject, general, European, Englishman, islander, master, servant, bigger, less, &c. to an almost infinite number; he being capable of as many relations as there can be occasions of comparing him to other things in any manner of agreement or disagreement, or any respect whatsoever.

The ideas of relations are much clearer and more distinct than those of the things related; because the knowledge of one simple idea is oftentimes sufficient to give the notion of a relation; but, to the knowing of any substantial being, an accurate collection of several ideas is necessary.

The perception we have of the relations between various ideas wherein the mind acquiesces, makes what we call judgment. Thus, when I judge that twice 2 make 4, or do not make 5, I only perceive the equality between twice 2 and 4, and the inequality between twice 2 and 5.

The perception we have of the relations between the relations of various things, constitutes what we call reasoning. Thus, when from this, that 4 is a smaller number than 6, and that twice 2 is equal to 4, I gather, that twice 2 is a less number than 6; I only perceive together the relation of the numbers twice 2 and 4, and the relation of 4 and 6.

The ideas of cause and effect, we get from our observation of the vicissitude of things, while we perceive some qualities or substances begin to exist, and that they receive their existence from the due application and operation of other beings. That which produceth, is the cause; that which is produced, is the effect.

Thus, fluidity in wax is the effect of a certain degree of heat, which we observe to be constantly produced by the application of such heat.

The denominations of things taken from time are, for the most part, only relations. Thus, when it is said, that queen Elizabeth lived sixty-nine, and reigned forty-five years, no more is meant, than that the duration of her existence was equal to sixty-nine, and of her government to forty-five, annual revolutions of the sun; and so are all words answering to how long.

RELATION, in mathematics. See RATIO.

RE'LATIVE. *a.* (*relativus*, Lat.) 1. Having relation; respecting (*Locke*). 2. Considered not absolutely, but as belonging to, or respecting something else (*South*). 3. Particular; positive: not in use (*Shakspeare*).

RELATIVE-TERMS, in logic, are words which imply relation; such are master and servant, husband and wife, &c. In grammar, relative words are those which answer to some other word foregoing, called the antecedent; such are the relative pronouns *qui, quæ, quod*, &c. and in English, who, whom, which, &c. The word answering to these relatives is often understood, as "I know whom you mean," for "I know the person whom you mean."

RE'LATIVE. *s.* 1. Relation; kinsman (*Taylor*). 2. Pronoun answering to an antecedent (*Asch.*). 3. Somewhat respecting something else (*Locke*).

RE'LATIVELY. *ad.* (from *relative*.) As it respects something else; not absolutely (*Sprat*).

RE'LATIVENESS. *s.* (from *relative*.) The state of having relation.

To RELA'X. *v. a.* (*relaxo*, Latin.) 1. To slacken; to make less tense (*Bacon*). 2. To remit; to make less severe or rigorous (*Swift*). 3. To make less attentive or laborious (*V. of W.*). 4. To ease; to divert. 5. To open; to loose (*Milton*).

To RELA'X. *v. n.* To be mild; to be remiss; to be not rigorous (*Prior*).

RELAXA'TION. *s.* (*relaxation*, French.) 1. Diminution of tension; the act of loosening (*Arbuthnot*). 2. Cessation of restraint (*Burnet*). 3. Remission; abatement of rigour (*Hooker*). 4. Remission of attention or application (*Addison*).

RELA'Y. *s.* (*relais*, Fr.) Horses on the road to relieve others.

To RELEA'SE. *v. a.* (*relascher*, Fr.) 1. To set free from confinement or servitude. 2. To set free from pain. 3. To free from obligation, or penalty (*Milton*). 4. To quit; to let go (*Dryden*). 5. To relax; to slacken: not in use (*Hooker*).

RELEA'SE. *s.* (*relasche*, Fr.) 1. Dismission from confinement, servitude, or pain. 2. Relaxation of a penalty (*Prior*). 3. Remission of a claim (*Bacon*). 4. Acquittance from a debt signed by the creditor.

RELEASE, in law, is an instrument in writing, by which estates, rights, titles, entries, actions, and other things, are extinguished and discharged; and sometimes transferred, abridged or enlarged; and in general, it signifies one person's giving up or discharging the right or action he has, or claims to have, against another, or his lands, &c.

A release may be either in fact or in law; a release in fact is where it is expressly declared, by the very words, as the act and deed of the party; and a release in law is that which acquits by way of consequence, as where a feme creditor takes the debtor to be her husband.

To RE'LEGATE. *v. a.* (*relegner*, French; *relego*, Lat.) To banish; to exile.

RELEGA'TION. *s.* (*relegatio*, Latin.) Exile; judicial banishment (*Ayliffe*).

To RELE'NT. *v. n.* (*relentir*, Fr.) 1. To soften; to grow less rigid or hard (*Bacon*). 2. To melt; to grow moist (*Boyle*). 3. To grow less intense (*Digby*). 4. To soften in temper; to grow tender; to feel compassion (*Milton*).

To RELE'NT. *v. a.* Obsolete. 1. To slacken; to remit (*Spenser*). 2. To soften; to mollify (*Spenser*).

RELE'NTLESS. *a.* (from *relent*.) Unpitying; unmoved by kindness or tenderness (*Prior*).

RE'LEVANT. *a.* (Fr.) Relieving.

RELEVA'TION. *s.* (*relevatio*, Latin.) A raising or lifting up.

RELHANIA, in botany, a genus of the class syngenesia, order polygamia superflua. Receptacle chaffy; seeds crowned with a short cylindrical membrane; calyx imbricate, scarious; florets of the ray numerous. Nineteen species. Cape herbs, some with clustered, others with solitary flowers.

RELI'ANCE. *s.* (from *rely*.) Trust; dependence; confidence (*Woodward*).

RELICS, in the Romish church, the remains of the bodies or clothes of saints or martyrs, and the instruments by which they were put to death, devoutly preserved, in honour to their memory; kissed, revered, and carried in procession. The respect which was justly due to the martyrs and teachers of the Christian faith, in a few ages increased almost to adoration; and at length adoration was really paid both to departed saints and to relics of holy men or holy things. The abuses of the church of Rome, with respect to relics, are very flagrant and notorious. For, such was the rage for them at one time, that, as F. Mabillon a Benedictine justly complains, the altars were loaded with suspected relicts; numerous spurious ones being every where offered to the piety and devotion of the faithful. He adds, too, that bones are often consecrated, which, so far from belonging to saints, probably do not belong to Christians. From the catacombs numerous relics have been taken, and yet it is not known who were the persons interred therein. In the 11th century, relics were tried by fire, and those which did not consume were reckoned genuine, and the rest not. Relics were, and still are, preserved on the altars whereon mass is celebrated; a square hole being made in the middle of the altar, big enough to receive the hand, and herein is the relic deposited, being

first wrapped in red silk, and enclosed in a leaden box.

The Rominists plead antiquity in behalf of relics: for the Manichees, out of hatred to the flesh, which they considered as an evil principle, refused to honour the relics of saints; which is reckoned a kind of proof that the Catholics did it in the first ages.

We know, indeed, that the touching of linen cloths on relics, from an opinion of some extraordinary virtue derived therefrom, was as ancient as the first ages, there being a hole made in the coffins of the 40 martyrs at Constantinople expressly for this purpose. The honouring the relics of saints, on which the church of Rome afterwards founded her superstitious and lucrative use of them, as objects of devotion, as a kind of charms or amulets, and as instruments of pretended miracles, appears to have originated in a very ancient custom that prevailed among Christians, of assembling at the cemeteries or burying-places of the martyrs, for the purpose of commemorating them, and of performing divine worship. When the profession of Christianity obtained the protection of the civil government, under Constantine the Great, stately churches were erected over their sepulchres, and their names and memories were treated with every possible token of affection and respect. This reverence, however, gradually exceeded all reasonable bounds; and those prayers and religious services were thought to have a peculiar sanctity and virtue, which were performed over their tombs. Hence the practice which afterwards obtained, of depositing relics of saints and martyrs under the altars in all churches. This practice was then thought of such importance, that St. Ambrose would not consecrate a church because it had no relics; and the council of Constantinople in Trullo ordained, that those altars should be demolished under which there were found no relics. The rage of procuring relics for this and other purposes of a similar nature became so excessive, that in 386 the emperor Theodosius the Great was obliged to pass a law, forbidding the people to dig up the bodies of the martyrs, and to traffic in their relics.

Such was the origin of that respect for sacred relics, which afterwards was perverted into a formal worship of them, and became the occasion of innumerable processions, pilgrimages, and miracles, from which the church of Rome, till very lately, derived incredible advantage. Besides the arguments from antiquity to which the Papists refer, in vindication of their worship of relics, Bellarmine appeals to Scripture in support of it, and cites the following passages, viz. Exod. xiii. 19. Deut. xxxiv. 6. 2 Kings xiii. 21. 2 Kings xxiii. 16, 17, 18. Isaiah xi. 10. Matthew xi. 20, 21, 22. Acts v. 12—15. Acts xix. 11, 12. See POPERY.

The Roman Catholics in Great Britain do not acknowledge any worship to be due to relics, but merely a high veneration and respect, by which means they think they honour God, who, they say, has often wrought very extraordinary miracles by them. But, however proper this veneration and respect may be, its abuse has been so great and so general, as fully to warrant the rejection of them altogether.

Relics are forbidden to be used or brought into England by several statutes: and justices of peace are empowered to search houses for popish books and relics, which when found, are to be defaced and burnt, &c. 3 Jac. I. cap. 26.

RE'LICLY. *ad.* (from *relic.*) In the manner of relics: not used (*Donne*).

RE'LICT. *s.* (*relicte*, old Fr.) A widow; a wife desolate by the death of her husband (*Sprat*).

RELIE'F. *s.* (*relief*, French.) 1. Alleviation of calamity; mitigation of pain or sorrow (*Milton*). 2. That which frees from pain or sorrow (*Dryden*). 3. Dismission of a sentinel from his post (*Shakspeare*). 4. (*relevium*, law Lat.) Legal remedy of wrongs. 5. The prominence of a figure in stone or metal; the seeming prominence of a picture (*Pope*). 6. The exposure of any thing, by the proximity of something different.

RELIEF, in law, a certain sum of money which the tenant holding by knight's service, grand serjeantry, or other tenure (for which homage, or legal service, is due), and being at full age at the death of his ancestor, paid to his lord at his entrance.

RELIE'VABLE. *a.* (from *relieve.*) Capable of relief (*Hale*).

To RELIE'VE. *v. a.* (*relevo*, Lat.) 1. To ease pain or sorrow. 2. To succour by assistance (*Dryden*). 3. To set a sentinel at rest, by placing another on his post (*Shakspeare*). 4. To right by law. 5. To recommend by the interposition of something dissimilar (*Stepney*). 6. To support; to assist (*Brown*).

RELIEVE, in a military sense, is to send off those men that are upon duty, and to bring others to take their place; thus, to relieve the guard, the trenches, &c. is to bring fresh men upon duty, and to discharge those who were upon duty before.

RELIE'VER. *s.* (from *relieve.*) One that relieves (*Rogers*).

RELIEVO, or RELIEF, in sculpture, &c. is the projecture or standing out of a figure which rises prominent from the ground or plane on which it is formed; whether that figure be cut with the chisel, moulded, or cast. There are three kinds or degrees of relievo, viz. alto, basso, and demi-relievo. The alto-relievo, called also haut-relief, or high-relievo, is when the figure is formed after nature, and projects as much as the life. Basso-relievo, bas-relief, or low relievo, is when the work is raised a little from the ground, as in medals, and the frontispieces of buildings; and particularly in the histories, festoons, foliages, and other ornaments of friezes. Demi-relievo is when one half of the figure rises from the plane. When, in a basso-relievo, there are parts that stand clear out, detached from the rest, the work is called a demi-basso. In architecture, the relievo or projecture of the ornaments ought

always to be proportioned to the magnitude of the building it adorns, and to the distance at which it is to be viewed.

RELIEVO, or RELIEF, in painting, is the degree of boldness with which the figures seem, at a due distance, to stand out from the ground of the painting. The relievo depends much upon the depth of the shadow, and the strength of the light; or on the height of the different colours, bordering on one another; and particularly on the difference of the colour of the figure from that of the ground: thus, when the light is so disposed as to make the nearest parts of the figure advance, and is well diffused on the masses, yet insensibly diminishing, and terminating in a large spacious shadow, brought off insensibly, the relievo is said to be bold, and the clair obscure well understood.

To RELI'GHT. *v. a.* (*re* and *light.*) To light anew (*Pope*).

RELI'GION. *s.* (*religio*, Lat.) 1. Virtue, as founded upon reverence of God, and expectation of future rewards and punishments (*Ben Jonson*). 2. A system of divine faith and worship, as opposite to others (*Tillotson*).

RELIGION, *religio*, that worship or homage which is due to God, considered as Creator, Preserver, and, with Christians, as Redeemer, of the world.

The foundation of all religion is, that there is a God; and that he requires some service at the hands of his creatures. From the different manners wherein we arrive at the knowledge of this service, religion is divided into natural and revealed.

Natural religion is whatever we discover to be due and meet, by the mere dictates of natural reason; as to love and honour God, not to abuse his creatures, &c.

Revealed religion is what we receive as the express declaration of God himself, by the mouths of prophets, &c. See REVELATION.

The first flows immediately from the relation between the creature and the Creator; the latter does not follow from such a relation, but is superadded from the mere will and pleasure of the Creator.

The first we ordinarily call morality, or ethics; because immediately conversant about the manners and duties of men towards one another; and towards themselves, considered as creatures of that Being.

The latter we call, by way of eminence, religion, as being the rule of our duty immediately to God himself.

The first supposes a God, a providence, a future state, rewards and punishments; the latter likewise supposes an immediate mission from God himself, attested by miracles, &c. See CHRISTIAN RELIGION.

RELIGION is more particularly used for that special system of faith and worship, which obtains in a particular age, sect, or country, &c.

In this sense we say the Romish religion, the reformed religion, the religion of the Greeks, the Mahometan religion, the Jewish religion, &c. See JUDAISM, MAHOMETANISM, &c.

RELI'GIONIST. *s.* (from *religion.*) A bigot to any religious persuasion (*Swift*).

The word is sometimes used to denote a religious person. But we do not much admire the use of it in either sense.

RELI'GIOUS. *a.* (*religiosus*, Latin.) 1. Pious; disposed to the duties of religion (*Shakspeare*). 2. Teaching religion (*Wotton*). 3. Among the Romanists, bound by the vows of poverty, chastity, and obedience (*Addison*). 4. Exact; strict. 5. Appropriated to strict observance of holy duties (*Law*).

RELI'GIOUSLY. *ad.* (from *religious.*) 1. Piously; with obedience to the dictates of religion (*Drayton*). 2. According to the rites of religion (*Shakspeare*). 3. Reverently; with veneration (*Duppa*). 4. Exactly; with strict observance (*Bacon*).

RELI'GIOUSNESS. *s.* (from *religious.*) The quality or state of being religious.

To RELI'NQUISH. *v. a.* (*relinquo*, Lat.) 1. To forsake; to abandon; to leave; to desert (*Davies*). 2. To quit; to release; to give up (*South*). 3. To forbear; to depart from (*Hooker*).

RELI'NQUISHMENT. *s.* (from *relinquish.*) The act of forsaking (*South*).

RE'LISH. *s.* (from *relecher*, Fr. to lick again.) 1. Taste; the effect of any thing on the palate: it is commonly used of a pleasing taste (*Boyle*). 2. Taste; small quantity just perceptible (*Shakspeare*). 3. Likely; delight in any thing (*Addison*). 4. Sense; power of perceiving excellence; taste (*Seed.*). 5. Delight given by any thing; the power by which pleasure is given (*Addison*). 6. Cast; manner (*Pope*).

To RE'LISH. *v. a.* (from the noun). 1. To give a taste to any thing (*Dryden*). 2. To taste; to have a liking (*Baker*).

To RE'LISH. *v. n.* 1. To have a pleasing taste (*Hakewill*). 2. To give pleasure (*Shakspeare*). 3. To have a flavour (*Woodward*).

RE'LISHABLE. *a.* (from *relish.*) Gustable; having a taste.

To RELI'VE. *v. n.* (*re* and *live.*) To revive; to live anew: not used (*Spenser*).

To RELO'VE. *v. a.* (*re* and *love.*) To love in return: not used (*Boyle*).

RELU'CENT. *a.* (*relucens*, Latin.) Shining; transparent; pellucid (*Thomson*).

To RELU'CT. *v. n.* (*reluctor*, Latin.) To struggle again (*Decay of Piety*).

RELU'CTANCE. RELU'CTANCY. *s.* (*reluctor*, Latin.) Unwillingness; repugnance (*Boyle*).

RELU'CTANT. *a.* (*reluctans*, Latin.) Unwilling; acting with repugnance (*Tickel*).

To RELU'CTATE. *v. n.* (*reluctor*, Lat.) To resist; to struggle against (*Decay of Piety*).

RELUCTA'TION. *s.* (*reluctor*, Lat.) Repugnance; resistance (*Bacon*).

To RELU'ME. *v. a.* To light anew; to rekindle (*Pope*).

To RELU'MINE. *v. a.* To light anew (*Shakspeare*).

To RELY'. *v. n.* (*re* and *lie.*) To lean upon with confidence; to put trust in; to rest upon; to depend upon (*Rogers*).

To REMAI'N. *v. n.* (*remaneo*, Lat.) 1. To be left out of a greater quantity or number (*Job*). 2. To continue; to endure; to be left in a particular state (*Milton*). 3. To be left after any event (*Locke*). 4. Not to be lost (*Spenser*). 5. To be left as not comprised.

To REMAI'N. *v. a.* To await; to be left to (*Spenser*).

REMAI'N. *s.* (from the verb.) 1. Relic; that which is left. Generally used in the plural (*Pope*). 2. The body left by the soul (*Pope*). 3. Abode; habitation: not in use (*Shakspeare*).

REMAI'NDER. *a.* (from *remain.*) Remaining; refuse; left (*Shakspeare*).

REMAI'NDER. *s.* 1. What is left; relics (*Bacon*). 2. The body when the soul is departed; remains (*Shakspeare*).

REMAINDER, in law, is an estate limited in lands, tenements, or rents, to be enjoyed after the expiration of another particular estate.

An estate in remainder is an estate limited to take effect and be enjoyed after another estate is determined. As if a man seised in fee simple grants lands to one for 20 years, and after the determination of the said term, then to another and his heirs for ever: here the former is tenant for years, remainder to the latter in fee. In the first place, an estate for years is created or carved out of the fee, and given to the former, and the residue and the remainder of it is given to the latter. Both their interests are in fact only one estate; the present term of years, and the remainder afterwards, when added together, being equal only to one estate in fee. 2 Black. c. 11.

The word remainder is no term of art, nor is it necessary to create a remainder. So that any words sufficient to shew the intent of the party, will create a remainder; because such estates take their denomination of remainder more from the nature and manner of their existence after they are limited, than from any previous quality inherent in the word. See Fearne on Remainders.

There is this difference between a remainder and a reversion: in case of a reversion, the estate granted, after the limited time, reverts to the grantor or his heirs; but by a remainder it goes to some third person, or a stranger.

To REMA'KE. *v. a.* (*re* and *make.*) To make anew (*Glanville*).

To REMA'ND. *v. a.* (*re* and *mando*, Lat.) To send back; to call back (*Davies*).

RE'MANENT. *s.* (*remanens*, Lat. *remanant*, old French. It is now contracted to *remnant.*) The part remaining (*Bacon*).

REMA'RK. *s.* (*remarque*, Fr.) Observation; note; notice taken (*Collier*).

To REMA'RK. *v. a.* (*remarquer*, Fr.) 1. To note; to observe (*Locke*). 2. To distinguish; to point out; to mark: not used (*Milton*).

REMA'RKABLE. *a.* (*remarquable*, Fr.) Observable; worthy of note (*Raleigh*).

REMA'RKABLENESS. *s.* Observableness; worthiness of observation (*Hammond*).

REMA'RKABLY. *ad.* (from *remarkable*). Observably; in a manner worthy of observation.

REMA'RKER. *s.* (*remarquer*, Fr.) Observer; one that remarks (*Watts*).

REMBRANDT (Van Rein), a Flemish painter, son of a miller, born near Leyden, 1606. His education was neglected, and he scarce knew how to read, but nature supplied all deficiencies, and gave him a genius, which soared to affluence and immortality. His manner was entirely his own, and his knowledge of the chiaro obscuro was particularly correct. His chief aim was to imitate living nature, and he succeeded to an admirable degree. He was singular in his conduct, he was fond of low company, and in his appearance slovenly. He died at Amsterdam about 1668. When once told that his grounds were dark, he replied, that he was a painter, not a dyer. He engraved some pieces after his own designs with great judgment.

REME'DIABLE. *a.* (from *remedy.*) Capable of remedy.

REME'DIATE. *a.* (from *remedy.*) Medicinal; affording a remedy: not in use (*Shakspeare*).

REME'DILESS. *a.* (from *remedy.*) Not admitting remedy; irreparable; cureless (*Raleigh*).

REME'DILESSNESS. *s.* (from *remediless.*) Incurableness.

REMEDIUM DIVINUM. See IMPERATORIA.

RE'MEDY. *s.* (*remedium*, Lat. *remede*, French.) 1. A medicine by which any illness is cured (*Swift*). 2. Cure of any uneasiness (*Dryden*). 3. That which counteracts any evil (*Locke*). 4. Reparation; means of repairing any hurt (*Shakspeare*).

To RE'MEDY. *v. a.* (*remedier*, Fr.) 1. To cure; to heal (*Hooker*). 2. To repair or remove mischief.

To REME'MBER. *v. a.* (*remembrare*, Ital.) 1. To bear in mind any thing; not to forget (*Psalms*). 2. To recollect; to call to mind (*Sidney*). 3. To keep in mind; to have present to the attention (*Locke*). 4. To bear in mind, with intent of reward or punishment (*Milton*). 5. To mention; not to omit (*Ayliffe*). 6. To put in mind; to force to recollect; to remind (*Sidney*). 7. To preserve from being forgotten (*Shakspeare*).

REME'MBERER. *s.* (from *remember.*) One who remembers (*Wotton*).

REME'MBRANCE. *s.* (*remembrance*, Fr.) 1. Retention in memory (*Denham*). 2. Recollection; revival of any idea (*Locke*). 3. Honourable memory: out of use (*Shakspeare*). 4. Transmission of a fact from one to another (*Addison*). 5. Account preserved (*Hale*). 6. Memorial (*Dryden*). 7. A token by which any one is kept in the memory (*Shakspeare*). 8. Notice of something absent (*Shakspeare*). 9. Power of remembering (*Milton*).

REME'MBRANCER. *s.* (from *remembrance.*) 1. One that reminds; one that puts in mind.

REMEMBRANCERS, anciently called clerks of the remembrance, certain officers in the exchequer, whereof three are distinguished by the names of the king's remembrancer, the lord treasurer's remembrancer, and the remembrancer of the first fruits. The king's remembrancer enters in his office all recognizances taken before the barons, for any of the king's debts, for appearances, or observing of orders; he also takes all bonds for the king's debts, &c. and makes out processes thereon. He likewise issues processes against the collectors of the customs, excise, and others, for their accounts; and informations upon penal statutes are entered and sued in his office, where all proceeding in matters upon English bills in the exchequer-chamber remain. His duty further is to make out the bills of compositions upon penal laws, to take the statement of debts; and into his office are delivered all kinds of indentures and other evidences, which concern the assuring of any lands to the crown. He every year, in crastino Animarum, reads in open court the statute for election of sheriffs; and likewise openly reads in court, the oaths of all the officers, when they are admitted.

The lord treasurer's remembrancer is charged to make out process against all sheriffs, escheators, receivers, and bailiffs, for their accounts. He also makes out writs of fieri facias, and extent for debts due to the king, either in the pipe or with the auditors; and process for all such revenue as is due to the king, on account of his tenures. He takes the account of sheriffs; and also keeps a record, by which it appears whether the sheriffs or other accountants pay their proffers due at Easter and Michaelmas; and at the same time he makes a record, whereby the sheriffs or other accountants keep their prefixed days; there are likewise brought into this office all the accounts of customers, comptrollers, and accountants, in order to make entry thereof on record; also all estreats and amercements are certified here, &c.

The remembrancer of the first fruits takes all compositions and bonds for the payment of first fruits and tenths; and makes out process against such as do not pay the same.

To REME'RCIE. *v. a.* (*remercier*, French.) To thank: obsolete (*Spenser*).

REMI (Joseph Honoré), of Remiremont, was advocate in the parliament of Paris. He lost his eye-sight at the age of eight by the small-pox, but recovered it six years after. He was author of Cosmopolisma—days, a burlesque, in opposition to Young's night thoughts—la code des François, 2 vols. 12mo.—eloge on de l'Hopital, a valuable work crowned by the French academy, though censured by the Sorbonne—eloges on Moliere, Colbert, Fenelon, &c.

To RE'MIGRATE. *v. n.* (*remigro*, Lat.) To remove back again (*Boyle*).

REMIGRA'TION. *s.* (from *remigrate.*) Removal back again (*Hale*).

To REMI'ND. *v. a.* (*re* and *mind.*) To put in mind; to force to remember (*South*).

REMINI'SCENCE. *s.* (*reminiscens*, Lat.) Recollection; recovery of ideas (*Hale*).

REMINISCE'NTIAL. *a.* (from *reminiscence.*) Relating to reminiscence (*Brown*).

REMI'SS. *a.* (*remis*, Fr. *remissus*, Latin.) 1. Not vigorous; slack (*Woodward*). 2. Not careful; slothful (*Shakspeare*). 3. Not intense (*Roscommon*).

REMI'SSIBLE. *a.* (from *remit.*) Admitting forgiveness.

REMI'SSION. *s.* (*remission*, Fr. *remissio*, Lat.) 1. Abatement; relaxation; moderation (*Bacon*). 2. Cessation of intenseness (*Woodward*). 3. In physic, *remission* is when a distemper abates, but does not go quite off before it returns again. 4. Release; abatement of right (*Swift*). 5. Forgiveness; pardon (*Taylor*).

REMI'SSLY. *ad.* (from *remiss.*) 1. Carelessly; negligently; without close attention (*Hooker*). 2. Not vigorously; not with ardour or eagerness; slackly (*Clarendon*).

REMI'SSNESS. *s.* (from *remiss.*) Carelessness; negligence; coldness; want of ardour (*Rogers*).

To REMI'T. *v. a.* (*remitto*, Latin.) 1. To relax; to make less intense (*Milton*). 2. To forgive a punishment (*Dryden*). 3. (*remettre*, Fr.) To pardon a fault (*Shakspeare*). 4. To give up; to resign (*Hayward*). 5. To defer; to refer (*Gov. of the Tongue*). 6. To put again in custody (*Dryden*). 7. To send money to a distant place (*Addison*). 8. To restore: not in use (*Hayward*).

To REMI'T. *v. n.* 1. To slacken; to grow less intense (*Broome*). 2. To abate by growing less eager (*South*). 3. In physic, to grow by intervals less violent.

REMI'TMENT. *s.* (from *remit.*) The act of remitting to custody.

REMI'TTANCE. *s.* (from *remit.*) 1. The act of paying money at a distant place. 2. Sum sent to a distant place (*Addison*).

REMITTENT FEVER. See FEBRIS CONTINUA.

REMI'TTER. *s.* (*remettre*, French.) 1. One who remits, or procures the conveyance and payment of money.

REMITTER, in law, is where one that has a right to lands, but is out of possession, has afterwards the freehold cast upon him by some subsequent defective title, and enters by virtue of that title; in this case the law remits him to his ancient and more certain right, and by an equitable fiction supposes him to have gained possession in consequence and by virtue thereof; and this, because he cannot possibly obtain judgment at law, to be restored to his prior right, since he is himself the tenant of the land. 3 Black. 190.

RE'MNANT. *s.* (corrupted from *remanent.*) Residue; that which is left (*Shakspeare*).

RE'MNANT. *a.* Remaining; yet left (*Prior*).

REMO (St.), a town of the territory of Genoa, situate in a fruitful valley, with a good

harbour, in the Mediterranean, seven miles E. by N. of Vintimiglia, and 17 W.N.W. of Oneglia.

REMO'LTEN. *part.* (from *remelt.*) Melted again (*Bacon*).

REMO'NSTRANCE. *s.* (*remonstrance*, Fr.) 1. Show; discovery: not in use (*Shakspeare*). 2. Strong representation (*Hooker*).

To REMO'NSTRATE. *v. n.* (*remonstro*, Lat.) To make a strong representation.

REMORA. The sucking fish. See ECHENEIS.

REMORA ARATRI. (*remoror*, to hinder, and *aratrum*, a plough; so called because it hinders the plough). See ONONIS.

To RE'MORATE. *v. a.* (*remorer*, Lat.) To hinder.

REMO'RSE. *s.* (*remorsus*, Latin.) 1. Pain of guilt (*Clarendon*). 2. Tenderness; pity; sympathetic sorrow (*Spenser*).

REMO'RSEFUL. *a.* (*remorse* and *full.*) Tender; compassionate (*Shakspeare*).

REMO'RSELESS. *a.* (from *remorse.*) Unpitying; cruel; savage (*South*).

REMO'TE. *a.* (*remotus*, Lat.) 1. Distant; not immediate (*Locke*). 2. Distant; not at hand (*Milton*). 3. Removed far off; placed not near (*Milton*). 4. Foreign. 5. Distant; not closely connected (*Glanville*). 6. Alien; not agreeing (*Locke*). 7. Abstracted (*Locke*).

REMOTE CAUSE, in medicine. See EXCITING CAUSE.

REMO'TELY. *ad.* Not nearly; at a distance.

REMO'TENESS. *s.* (from *remote.*) State of being remote; distance; not nearness (*Boyle*).

REMO'TION. *s.* (from *remotus*, Latin.) The act of removing; the state of being removed to distance (*Brown*).

REMO'VABLE. *a.* (from *remove.*) Such as may be removed (*Spenser*).

REMO'VAL. *s.* (from *remove.*) 1. The act of putting out of any place (*Hooker*). 2. The act of putting away (*Arbuthnot*). 3. Dismission from a post (*Swift*). 4. The state of being removed (*Locke*).

To REMO'VE. *v. a.* (*removeo*, Lat.) 1. To put from its place; to take or put away. 2. To place at a distance (*Locke*).

To REMO'VE. *v. n.* 1. To change place. 2. To go from one place to another (*Dryden*).

REMO'VE. *s.* (from the verb.) 1. Change of place. 2. Susceptibility of being removed (*Glanville*). 3. Translation of one to the place of another (*Shakspeare*). 4. State of being removed (*Locke*). 5. Act of moving a chessman or draught. 6. Departure; act of going away (*Waller*). 7. The act of changing place (*Bacon*). 8. A step in the scale of gradation (*Locke*). 9. A small distance (*Rogers*). 10. Act of putting a horse's shoes upon different feet (*Swift*). 11. A dish to be changed while the rest of the course remains.

REMO'VED. *particip. a.* Remote; separate from others (*Shakspeare*).

REMO'VEDNESS. *s.* (from *removed.*) The state of being removed; remoteness (*Shakspeare*).

REMO'VER. *s.* (from *remove.*) One that removes (*Bacon*).

REMOVER, in law, is where a suit is removed or taken out of one court into another; and is the opposite of remanding a cause, or sending it back into the same court whence it was first called.

To REMOU'NT. *v. n.* (*remonter*, French.) To mount again (*Dryden*).

REMPHAN, an idol or Pagan god whom St. Stephen says the Israelites worshipped in the wilderness as they passed from Egypt to the Land of Promise: "Yea, ye took up the tabernacle of Moloch, and the star of your god Remphan: figures which ye made to worship them." That the martyr here quotes the following words of the prophet Amos, all commentators are agreed: "Ye have borne the tabernacle of your Moloch and Chiun your images, the star of your god, which ye made to yourselves." But if this coincidence between the Christian preacher and the Jewish prophet be admitted, it follows, that Chiun and Remphan are two names of one and the same deity. This is indeed further evident from the LXX translators having substituted in their version the word Ραιφαν, instead of Chiun, which we read in the Hebrew and English bibles. But the question which still remains to be answered is, what god was worshipped by the name of Remphan, Raiphan, or Chiun? for about the other divinity here mentioned there is no dispute. See MOLOCH.

The word Chiun may with equal propriety be written Kiun, Kion, or even Kyon, the Hebrew *jod* being convertible into the Greek υ or the Roman *y*; but the words Cane, Chan, Kan, or Khan, which are often diversified into Ken, Kyn, Cohen, Cahan, signifying head, chief, prince, king, &c. are diffused through a great part of Asia and Europe. In the Chinese language Quin, which signifies a king, is so similar to the word Chiun or Khiun under consideration, that no etymologist will hesitate to pronounce them of the same original and the same import. The word Kan or Khan is universally known to be an honorary title in Tartary; and Kaian or Kain, which is manifestly cognate of the word Chiun or Kiun, is, in the Plhevi or old Persian language, the epithet applied to the dynasty of princes which succeeded Cyrus the Great. Among the Scythians or ancient Tartars, Ghiun signifies the sun and likewise the day; and Kung, Kinung, Kun, runs through all the dialects of the Gothic tongue, every where denoting a chief or sovereign. In the Syrian dialect, Kon signifies a prince; and hence the Almighty is styled (Gen. xiv. 19.) Konah, which is translated possessor, but might have, with perhaps more propriety, been rendered Sovereign of heaven and earth. In Hebrew, the word Kahan or Kahen, which is the very same with Khan or Kan, signifies either a priest or a prince; and in Egypt Kon was the name of

the first Hercules or the sun. Hence the same word in composition denotes greatness, as Can-obus the great serpent; Can-athoth, the great Thoth or Mercury; Can-osiris, the great Osiris.

From this deduction we would conclude, that the word, which is found in so many tongues, and always denotes chief, prince, sovereign, is the very word Chiun which the Egyptians and Hebrews applied to Sothis, as being, in their conceptions, the chief or sovereign of all the stars. This will appear still more probable, when we have ascertained the import of the word Remphan, or, as the LXX have it, Raiphan.

Phan, the latter part of this word, is unquestionably the same with Pan, the most ancient of the Egyptian gods (see PAN). It is likewise a cognate of the Hebrew Phanah, conspexit, spectavit, vidit; and the radical word seems to be Phah, which signifies sometimes the countenance, and sometimes light. Hence Phaethon, which is compounded of *pha* light, *eth* or *esh* fire, and *on* strength, came to be one of the names of the sun. Rai, which we commonly write Rajah, has long signified, among the Indians, a subordinate prince; and we know that between India and Egypt there was a very early intercourse. Raiphan, therefore, may be either the royal light or the bright prince, subordinate to Osiris; and in either sense it was a very proper epithet of Sothis in the Egyptian kalendar. The word Rem or Rom, again (for it is sometimes written Remphan, and sometimes Rompha), is no other than the Hebrew רום *Rum*, high, exalted. Hence Remphan is the high or exalted light, which Sothis certainly was.

For this etymological disquisition we are indebted to Dr. Doig, the learned author of Letters on the Savage State, who has written a dissertation on Chiun and Remphan, of great value. What confirms his interpretation is, that the idol consecrated by the Egyptians to Sothis, or the dog-star, was a female figure with a star on her head; and hence the prophet upbraids his countrymen with having borne the star of their deity.

It ought to be observed, however, that several learned men are of opinion that both Remphan and Chiun were names for Saturn. See the note to archbishop Newcome's translation of Amos, v. 26. Hammond on Acts vii. 43, &c.

REMULUS, a chief of Tibur, whose arms were seized by the Rutulians, and afterwards became part of the plunder which Euryalus obtained.—2. A friend of Turnus, trampled to death by his horse which Orsilochus had wounded.

REMU'NERABLE. *a.* (from *remunerate.*) Rewardable.

To REMU'NERATE. *v. a.* (*remunero*, Latin.) To reward; to repay; to requite (*Boyle*).

REMUNERATION. *s.* (*remuneratio*, Lat.) Reward; requital; recompense; repayment.

REMU'NERATIVE. *a.* (from *remunerate.*) Exercised in giving rewards (*Boyle*).

REMURIA, festivals established at Rome by Romulus, to appease the manes of his brother Remus. They were afterwards called Lemuria, and celebrated yearly.

To REMU'RMUR. *v. a.* (*re* and *murmur.*) To utter back in murmurs; to repeat in low hoarse sounds (*Pope*).

To REMU'RMUR. *v. n.* (*remurmuro*, Latin.) To murmur back; to echo a low hoarse sound (*Dryden*).

REMUS, the son of Rhea Silvia, and Romulus his brother: they were twins, and ordered by the command of their uncle Amulius Silvius to be thrown into the Tiber; but they were taken up and saved by Faustulus, who was Numitor's shepherd. He carried them to his wife, by whom they were carefully nursed. Some said that while the cradle was upon the brink of the river, a she-wolf, brought thither by the crying of the infants, gave them suck. Others have been of opinion, that the wantonness of Laurentia, Faustulus's wife, gave occasion to this fable, because such women were called she-wolves. Authors vary in their opinions concerning the death of Remus; some saying, that Romulus slew his brother, because he ridiculed him upon the account of the fortifications he had made to his new city; while others will have him to have been killed by the soldiery: but be it as it will, it is certain Remus cemented the walls of Rome with his own blood.

REMY (St.), a town of France, in the department of Mouths of the Rhone. A triumphal arch, and a mausoleum, in the neighbourhood, display the taste of the Augustan age: the first is not entire; but the second is in the best state of preservation. St. Remy is 10 miles N.E. of Arles.

RENAL GLANDS. Glandulæ renales. Renal capsules. Supra-renal glands. The supra-renal glands are two hollow bodies, like glands in fabric, and placed one on each side upon the kidney. They are covered by a double tunic, and their cavities are filled with a liquor of a brownish red colour. Their figure is triangular; and they are larger in the fœtus than the kidneys; but in adults they are less than the kidneys. The right is affixed to the liver, the left to the spleen and pancreas, and both to the diaphragm and kidneys. They have arteries, veins, and lymphatics and nerves; their arteries arise from the diaphragmatic, the aorta, and the renal arteries. The vein of the right supra-renal gland empties itself into the vena cava; that of the left into the renal vein; their lymphatic vessels go directly to the thoracic duct; these are nerves common alike to these glands and the kidneys. They have no excretory duct, and their use is at present unknown. It is supposed they answer one use in the fœtus, and another in the adult, but what these uses are is uncertain. Boerhaave supposed their use to consist in their furnishing lymph to dilute the blood returned after the

secretion of the urine in the renal vein; but this is very improbable, since the vein of the right supra-lenal gland goes to the vena cava, and the blood carried back by the renal vein wants no dilution. It has also been said, that these glands not only prepare lymph, by which the blood is fitted for the nutrition of the delicate fœtus; but that in adults they serve to restore in themselves, to the blood of the vena cava, the irritable parts which it loses by the secretion of bile and urine. Some, again, have considered them as diverticula in the fœtus, to divert the blood from the kidneys, and lessen the quantity of urine. The celebrated Morgagni believed their office to consist in conveying something to the thoracic duct. It is singular, that in children who are born without the cerebrum, these glands are extremely small, and sometimes wanting.

RENAL VESSELS. See EMULGENT VESSELS.

RE'NARD. *s.* (*renard*, a fox, Fr.) The name of a fox in fable (*Dryden*).

RENA'SCENT. *a.* (*renascens*, Lat.) Produced again; rising again into being.

RENA'SCIBLE. *a.* (*renascor*, Lat.) Possible to be produced again.

To RENA'VIGATE. *v. a.* (*re* and *navigate.*) To sail again.

RENAU D'ELISAGARAY (Bernard), a mathematician of Bearn. He was employed by Lewis XIV. in improving the construction of vessels, for which he was rewarded with a pension. He advised the bombarding of Algiers, which succeeded against the opinion of other engineers, and afterwards he conducted the sieges of Philipsburg, Manheim, &c. He was made counsellor of marines, and grand cross of the order of St. Louis, and enjoyed the rank and privileges of a captain of the navy. He died 1719, aged 67. He wrote the theory of the management of ships, 1689, 8vo.—letters in answer to the objections of Huygens and Bernouilli against his opinions, &c.

RENAUDOT (Theophrastus), known as the first editor of gazettes in France, 1631, was born at Loudun, and died at Paris, 1653, aged 70. He published an abridgment of the prince de Conde's life, 4to.—marshal Gassion's life—cardinal Michael Mazarin's life, 4to. &c.

RENAUDOT (Eusebius), born at Paris in 1646, and distinguished for his learning in oriental history. He was of the congregation of the oratory, but his reputation increasing by his publications, the cardinal de Noailles took him to Rome, where Clement V. honoured him with the priory of Frossay in Britanny. He was made a member of the academy de la Crusca, and afterwards became a member of the academy of Inscriptions, and of the French academy. He died in 1720.

RENCOU'NTER. *s.* (*rencontre*, French.) 1. Clash; collision (*Collier*). 2. Personal opposition (*Addison*). 3. Loose or casual engagement (*Addison*). 4. Sudden combat without premeditation.

To RENCOU'NTER. *v. n.* (*rencontrer*, Fr.) 1. To clash; to collide. 2. To meet an enemy unexpectedly. 3. To skirmish with another. 4. To fight hand to hand.

To REND. *v. a.* pret. and part. pass. *rent.* (pendan, Saxon.) To tear with violence; to lacerate (*Pope*).

RE'NDER. *s.* (from *rend.*) One that rends; a tearer.

To RE'NDER. *v. a.* (*rendre*, Fr.) 1. To return; to pay back (*Locke*). 2. To restore; to give back (*Addison*). 3. To give upon demand (*Proverbs*). 4. To invest with qualities; to make (*South*). 5. To represent; to exhibit (*Shakspeare*). 6. To translate (*Burnet*). 7. To render; to yield; to give up (*Clarendon*). 8. To offer; to give to be used (*Watts*).

RE'NDER. *s.* (from the verb.) Surrender (*Shakspeare*).

RE'NDEZVOUS. *s.* (*rendez vous*, Fr.) 1. Assembly; meeting appointed (*Raleigh*). 2. A sign that draws men together (*Bacon*). 3. Place appointed for assembly (*Clarendon*).

To RE'NDEZVOUS. *v. n.* (from the noun.) To meet at a place appointed.

RENDI'TION. *s.* (from *render.*) Surrendering; the act of yielding.

RENDSBURG, a fortified town of Lower Saxony, in the duchy of Holstein, on the frontiers of Sleswick, and on the river Eyder. It is composed of three parts, the Old Town, the Sklcusskule, and the New Town; the former of which stands on an island formed by the river. The principal manufactures are porcelain, earthen ware, and gold and silver lace; and its trade in timber, by means of the Eyder canal, is considerable. It is 15 miles W. of Kiel, and 16 S.S.E. of Sleswick. Lon. 9. 53 E. Lat. 54. 20 N.

RENEALMIA, in botany, a genus of the class monandria, order monogynia. Corol three-cleft; nectary oblong; calyx one-leafed, broken into two or three irregular teeth; anther sessile, opposite the nectary; berry fleshy. One species; a Surinam tree, twenty feet high; leaves lanceolate, with an undulate margin; raceme proceeding from the trunk above the root.

RENEGA'DE. RENEGA'DO. *s.* (*renegado*, Spanish.) 1. One that apostatizes from the faith; an apostate (*Addison*). 2. One who deserts to the enemy; a revolter.

To RENE'GE. *v. a.* (*renego*, Lat. *renier*, Fr.) To disown (*King Charles*).

RENES. (απο του ρειν; because through them the urine flows.) See KIDNEYS.

RENETTE, an instrument of polished steel, with which farriers discover a prick in a horse's foot.

To RENE'W. *v. a.* (*re* and *new.*) 1. To renovate; to restore to the former state. 2. To repeat; to put again in act (*Dryden*). 3. To begin again (*Dryden*). 4. In theology, to make anew; to transform to new life (*Romans*).

RENE'WABLE. *a.* (from *renew.*) Capable to be renewed (*Swift*).

RENE'WAL. *s.* (from *renew.*) The act of renewing; renovation (*Forbes*).

RENFREW, a borough of Scotland, and the county-town of Renfrewshire. The principal branch of trade is the thread, but many looms are employed in the silk and muslin manufactures. Robert II. had a palace here, of which nothing remains but the exterior ditch. It is seated near the Clyde, to which there is a canal, 11 miles W. by N. of Glasgow, and 13 E. by S. of Greenock. Lon. 4. 26 W. Lat. 55. 54 N.

RENFREWSHIRE, a county of Scotland, 28 miles long, and from 10 to 20 broad; bounded on the W. and N. by the frith of Clyde, E. by Lanerkshire, and S. by Ayrshire. It is divided into 17 parishes, and the number of inhabitants in 1801 was 78,058. In the N. part, toward the borders of the Clyde, the soil is fertile, but the S. part is mountainous, and rather barren. Besides the Clyde, it is watered by the Gryfe, and the White and Black Cart. The largest town is Paisley.

RENIFORM LEAF, in botany. A kidney-shaped leaf.—Subrotundum, basi excavatum, angulis destitutum. Philos. Bot.—Subrotundum, basi exsculptum absque angulis posticis. Delin. Pl.—Roundish, hollowed out at the base, without angles: as in convolvulus soldanella, the lower leaves of campanula rotundifolia, saxifraga granulata, glecoma hederacea.—This term is applied also to the anther and seed.

RE'NITENCY. *s.* (from *renitent.*) The resistance in solid bodies, when they press upon, or are impelled one against another (*Quincy*).

RENI'TENT. *a.* (*renitens*, Lat.) Acting against any impulse by elastic power (*Ray*).

RENNES, a city of France, capital of the department of Ille and Vilaine, and a bishop's see. It contains eight parish-churches, beside the cathedral, and several convents. The streets are broad and straight; but they were narrow before the fire in 1720, which lasted seven days, and consumed 850 houses. In the great square is the Palace of Justice, and the Hotel de Ville. It is seated on the Vilaine, which divides it into two parts, 58 miles N. by W. of Nantes, and 190 W.S.W. of Paris. Lon. 1. 42 W. Lat. 48. 7 N.

RENNET, or RUNNET; the juice or gastric fluid found in the stomach of sucking quadrupeds which have received no other nourishment than their mother's milk. In ruminating animals, which have several stomachs, it is generally found in the left or lowest, which is, in reality, the only proper stomach, the others being only ventricles or vestibules to it. Rennet, however, is occasionally traced even in the third or lowest stomach but one, and which, in vulgar language, is denominated the *maniplus* or rather *manyplies*, from its convolute structure, as the last of all is the *red* from its colour; by the French *le caillé*, or the curdle, since in this division the milk of a sucking quadruped first assumes a curdled appearance.

If the rennet or gastric juice be dried in the sun, and then kept close, it may be preserved in perfection for years. The stomach itself however of the sucking calf may be employed instead of the rennet or gastric juice for the purpose of curdling milk, and will require no previous preparation. The common mode of preserving it for this purpose is merely to clean it well, salt it, and hang it up in brown paper: when it is wanted, a piece about the length of the finger is cut off, and put into a glass, and three or four spoonsfull of water are poured upon it, and suffered to remain from sixteen to twenty-four hours: after which the infusion is mixed with the milk, and the curdle becomes instantly produced.

This property possessed by rennet of coagulating the caseous part of milk was known in the time of Dioscorides; and as it has been remarked that acids have the same effect, this property of the rennet has been also ascribed to an acid; and many celebrated writers have observed that the gastric juice of carnivorous animals is occasionally acid. Thus Floyer asserts that he found it so in carnivorous birds; Marsigli in the eagle; Viridet in carnivorous fishes; and Lorenzini in the gymnotus or cramp-fish: but all have attributed this acidity to a morbid state of the gastric juice. With respect however to the rennet, it is the fourth stomach of quadrupeds alone that naturally possesses this property: thus the juice found in the crops of birds is destitute of it. Macquer looked upon its coagulating power as arising from the remnant of sour milky matter, which he thought was sufficient to coagulate other milk. It has since, however, been sufficiently proved that, though limited to the organ before us, the coagulating quality is seated, as we have already observed, in the gastric juice; and that it is merely communicated to the coat of the stomach and to a certain range of the neighbouring parts in consequence of their being impregnated with this fluid. But it still remains to determine whether this property proceed from the gastric juice of the fourth stomach of the calf, being an acid of a very peculiar nature, or whether it proceeds from any other quality of this fluid.

To decide this question Morveau digested at different times parts of the interior tunic of the stomach of the calf, both in hot and cold water, previously distilled: he then poured some spirit of wine upon it, which occasioned a precipitate, and he always found that the filtrated liquor sensibly changed blue water to a red, hence clearly appearing to show the existence of an acid; and as he found a similar effect produced very generally by treating the gastric juice of various other quadrupeds in the same manner, he has ventured to place it in the French Encyclopédie among the animal acids, under the name of gastric acid, at the same time expressing some doubt whether acidity be an essential part of its nature. Spalanzani, however, seems to have shown that the acid property is at least in various instances accidental, and depends altogether upon the nature of the materials that form the food: and Monck in several instances found that calcined magnesia was not in the smallest degree soluble

in the gastric juices of different animals, and consequently possessed no acidity whatever; although he admits that under particular circumstances such an acid may be produced. The result of the whole is that we are not sufficiently acquainted with the nature of the gastric juice in any animal to determine on the cause of its coagulating property in the organ before us.

To RE'NOVATE. *v. a.* (*renovo*, Lat.) To renew; to restore to the first state (*Thomson*).

RENOVA'TION. *s.* (*renovatio*, Lat.) Renewal; the act of renewing (*Bacon*).

To RENOU'NCE. *v. a.* (*renoncer*, Fr.) 1. To disown; to abnegate (*Dryden*). 2. To quit upon oath (*Kettlewell*).

To RENOU'NCE. *v. n.* To declare renunciation (*Dryden*).

RENOU'NCEMENT. *s.* (from *renounce.*) Act of renouncing; renunciation (*Shak.*).

RENO'WN. *s.* (*renommée*, Fr.) Fame; celebrity; praise widely spread (*Waller*).

To RENO'WN. *v. a.* (*renommer*, Fr.) To make famous (*Pope*).

RENO'WNED. *particip. a.* (from *renown.*) Famous; celebrated; eminent; famed (*Dryden*).

RENT. *s.* (from *rend.*) A break; a laceration.

To RENT. *v. a.* (rather to *rend.*) To tear; to lacerate (*Ecclus.*).

To RENT. *v. n.* To roar; to rant (*Hudibras*).

RENT. *s.* (*rente*, Fr.) 1. Revenue; annual payment (*Pope*). 2. Money paid for any thing held of another.

RENT, is a certain profit issuing yearly, out of lands and tenement corporeal.

There are at common law three kinds of rents; rent service, rent charge, and rent seck, or rack rent.

Rent service is where the tenant holds his land of his lord by fealty and certain rent; or by homage, fealty, and certain rent; or by other service and certain rent; and it is called a rent service, because it has some corporal service incident to it, which at least is fealty. Rent charge is so called because the land for payment of it is charged with a distress. Rent seck, or rack rent, is where the land is granted without any clause of distress for the same. 1 Inst. 141.

The time for payment of rent, and consequently for a demand, is such a convenient time before the sun-setting of the last day, as will be sufficient to have the money counted; but if the tenant meets the lessor on the land at any time of the last day of payment, and tenders the rent, that is sufficient tender, because the money is to be paid indefinitely on that day, and therefore a tender on that day is sufficient. See DISTRESS.

To RENT. *v. a.* (*renter*, French.) 1. To hold by paying rent (*Addison*). 2 To set to a tenant.

RE'NTABLE. *a.* (from *rent.*) That may be rented.

RE'NTAL. *s.* (from *rent.*) Schedule or account of rents.

RE'NTER. *s.* (from *rent.*) He that holds by paying rent (*Locke*).

RENTERING, in the manufactories, the same with fine-drawing. It consists in sewing two pieces of cloth edge to edge, without doubling them, so that the seam scarcely appears; and hence it is denominated fine-drawing. It is a French word meaning the same thing, and is derived from the Latin *retrahere*, or *re*, in, and *trahere*, because the seam is drawn in or covered. It is said, that in the East Indies, if a piece of fine muslin is torn, and afterwards mended by the fine-drawers, it will be impossible to discover where the rent was. In this country the dexterity of the fine-drawers is not so great as that of those in the East; but it is still such as to enable them to defraud the revenue, by sewing a head or slip of English cloth on a piece of Dutch, Spanish, or other foreign cloth; or a slip of foreign cloth on a piece of English, so as to pass the whole as of a piece, and by that means avoid the duties, penalties, &c. The trick was first discovered in France, by M. Savary.

RENTERING, in tapestry, is the working new warp into a piece of damaged tapestry, whether eaten by the rats or otherwise destroyed, and on this warp to restore the antient pattern or design. The warp is to be of woollen, not linen. Among the titles of the French tapestry-makers is included that of renterers.

RENTOWN, a village of Scotland, four miles N.W. of Dumbarton. Near it is one of the most considerable printfields in Scotland; also the old mansion of Dalquhurn, where Dr. Smollett was born, and the lofty column erected to his memory, on the bank of the Leven.

RENTY, a town of France, in the department of Pas de Calais, seated on the river Aa, 12 miles S.W. of Aire, and 50 N.W. of Arras.

RE'NVERSED. *a.* (*renversé*, Fr.) Overturned (*Spenser*).

RENUNCIA'TION. *s.* (*renunciatio*, Lat.) The act of renouncing (*Taylor*).

To REORDA'IN. *v. a.* (*reordiner*, Fr.) To ordain again, on supposition of some defect in the commission granted to a minister.

REORDINA'TION. *s.* (from *reordain.*) Repetition of ordination (*Atterbury*).

To REPA'CIFY. *v. a.* (*re* and *pacify.*) To pacify again (*Daniel*).

REPAILLÆ, a town of Savoy, in Chablais, famous for the retreat of Amadeus, duke of Savoy, in 1440, when he went to enjoy the pleasures of a country life. Here is a Carthusian monastery, remarkable for its extensive prospects. It is seated on a river which runs into the lake of Geneva, 20 miles N.E. of Geneva.

To REPAI'R. *v. a.* (*reparo*, Lat. *reparer*, Fr.) 1. To restore after injury or dilapidation (*Clarendon*). 2. To amend an injury by an equivalent (*Milton*). 3. To fill up anew, by

something put in the place of what is lost (*Milton*).

REPAI'R. *s.* (from the verb.) Reparation; supply of loss; restoration after dilapidation (*Wilk.*).

To REPAI'R. *v. n.* (*repairer*, Fr.) To go to; to betake himself (*Pope*).

REPAI'R. *s.* (*repaire*, Fr.) 1. Resort; abode (*Dryden*). 2. Act of betaking himself any whither (*Clarendon*).

REPAI'RER. *s.* (from *repair.*) Amender; restorer (*South*).

REPAND LEAF. Repandum folium. In botany. Cujus margo angulis, eisque interjectis sinubus, circuli segmento inscriptis terminatur. The rim of which is terminated by angles, having sinuses between them inscribed in the segment of a circle.—In Delin. Pl. it is differently described margine flexuoso, tamen plano: with a flexuose or waving rim, but flat. Properly speaking, says Dr. Berkenhout, having a serpentine margin, without any angles at all. But this by no means agrees with the first explanation from Linnéus's Philosophia Botanica.—It is clearly distinct from the undulating or waving leaf; for the curvature in that respects the disk; but in this, the edge only.

REPA'NDOUS. *a.* (*repandus*, Lat.) Bent upward (*Brown*).

RE'PARABLE. *a.* (*reparabilis*, Lat.) Capable of being amended, retrieved, or supplied by something equivalent (*Bacon*).

RE'PARABLY. *ad.* (from *reparable.*) In a manner capable of remedy by restoration, amendment, or supply.

REPARA'TION. *s.* (*reparatio*, Latin.) 1. The act of repairing; instauration (*Arbuthnot*). 2. Supply of what is wasted (*Arbuthnot*). 3. Recompense for any injury; amends (*Dryden*).

REPA'RATIVE. *s.* (from *repair.*) Whatever makes amends for loss or injury (*Wotton*).

REPARTEE'. *s.* (*repartie*, French.) Smart reply.

To REPARTEE'. *v. n.* To make smart replies.

To REPA'SS. *v. a.* (*repasser*, Fr.) To pass again; to pass back (*Raleigh*).

To REPA'SS. *v. n.* To go back in a road (*Dryden*).

REPA'ST. *s.* (*repas*, Fr.) 1. A meal; act of taking food (*Denham*). 2. Food; victuals (*Shakspeare*).

To REPA'ST. *v. a.* (*repaistre*, French.) To feed; to feast (*Shakspeare*).

REPA'STURE. *s.* (*re* and *pasture*). Entertainment: not in use (*Shakspeare*).

To REPA'Y. *v. a.* (*repayer*, Fr.) 1. To pay back in return, in requital, or in revenge (*Bacon*). 2. To recompense (*Milton*). 3. To compensate (*Bacon*). 4. To requite either good or ill (*Pope*). 5. To reimburse with what is owed (*Shakspeare*).

REPA'YMENT. *s.* (from *repay.*) 1. The act of repaying. 2. The thing repaid (*Arbuthnot*).

To REPEA'L. *v. a.* (*repeller*, Fr.) 1. To recall: out of use (*Shakspeare*). 2. To abrogate; to revoke (*Dryden*).

REPEA'L. *s.* (from the verb.) 1. Recall from exile: not in use (*Shakspeare*). 2. Revocation; abrogation (*Davies*).

No act of parliament can be repealed the same session in which it was made or passed.

To REPEAT. *v. a.* (*repeto*, Lat.) 1. To iterate; to use again; to do again (*Arbuthnot*). 2. To speak again (*Hooker*). 3. To try again (*Dryden*). 4. To recite; to rehearse (*Milton.*)

REPEAT, in music, a character shewing that what was last played or sung, must be repeated, or gone over again.

The repeat serves instead of writing the same thing twice over. There are two kinds of repeats; the great and the small.

The great repeat, is only a double bar, dotted on each side; or two parallel lines drawn perpendicular across the staff; with dots on either hand.

The small repeat, is where only some of the last measures of a strain are to be repeated: this is denoted by a character set over the place where the repetition begins (see CHARACTERS in music), and continues to the end of the strain. See MUSIC.

REPEA'TEDLY. *ad.* (from *repeated.*) Over and over; more than once (*Stephens*).

REPEA'TER. *s.* (from *repeat.*) 1. One that repeats; one that recites. 2. A watch that strikes the hours at will.

REPEHAM, a town in Norfolk, with a market on Saturday. It has two churches in one churchyard, and is seated in a valley, 15 miles N.W. of Norwich, and 111 N.E. of London.

To REPE'L. *v. a.* (*repello*, Lat.) 1. To drive back any thing (*Hooker*). 2. To drive back an assailant (*Dryden*).

To REPE'L. *v. n.* 1. To act with force contrary to force impressed. 2. To *repel* in medicine, is to prevent such an afflux of a fluid to any particular part as would raise it into a tumour (*Quincy*).

REPELLENTS, in medicine, remedies which drive back a morbid humour into the mass of blood, from which it was unduly secreted.

REPE'LLER. *s.* (from *repel.*) One that repels.

To REPE'NT. *v. n.* (*repentir*, Fr.) 1. To think on any thing past with sorrow. 2. To express sorrow for something past (*Shakspeare*). 3. To change the mind from some painful motive (*Exodus*). 4. To have such sorrow for sin, as produces amendment of life (*Matthew*).

To REPE'NT. *v. a.* 1. To remember with sorrow (*Shakspeare*). 2. To remember with pious sorrow (*Donne*).

REPENT ROOT, in botany, a creeping root. —Longe excurrens hinc inde germinans, s. radiculas demittens.—Repent stem, creeping stem; radiculas hinc inde exserens procumbendo; as in hedera, bignonia, &c.

REPE'NTANCE. *s.* (*repentance*, French.) 1. Sorrow for any thing past (*Law*). 2. Sorrow for sin, such as produces newness of life; penitence (*Whitgift*).

REPE'NTANT. *a.* (*repentant*, French.) 1. Sorrowful for the past. 2. Sorrowful for sin (*Milton*). 3. Expressing sorrow for sin (*Shakspeare*).

To REPEO'PLE. *v. a.* (*re* and *people*.) To stock with people anew (*Hale*).

To REPERCU'SS. *v. a.* (*repercussus*, Lat.) To beat back; to drive back: not in use (*Bacon*).

REPERCU'SSION. *s.* (*repercussio*, Lat.) The act of driving back; rebound (*Bacon*).

REPERCU'SSIVE. *s.* (*repercussif*, Fr.) 1. Having the power of driving back, or causing a rebound (*Pattison*). 2. Repellent (*Bacon*). 3. Driven back; rebounding (*Thomson*).

REPERTI'TIOUS. *a.* (*repertus*, Latin.) Found; gained by finding.

REPE'RTORY. *s.* (*repertorium*, Lat.) A treasury; a magazine; a book in which any thing is to be found.

In this latter sense there has for some years been published monthly a Repertory of Arts and Manufactures, containing, besides other interesting matter, a more complete collection of specifications of patents than is any where else to be met with.

REPETENT, in arithmetic. See CIRCULATING DECIMAL and RECUR.

REPETI'TION. *s.* (*repetitio*, Lat.) 1. Iteration of the same thing (*Arbuthnot*). 2. Recital of the same words over again (*Hooker*). 3. The act of reciting or rehearsing (*Shakspeare*). 4. Recital (*Chapman*).

To REPI'NE. *v. n.* (*re* and *pine*.) 1. To fret; to be discontented (*Temple*). 2. To envy (*Dryden*).

REPI'NER. *s.* (from *repine*.) One that frets or murmurs.

To REPLA'CE. *v. a.* (*replacer*, Fr.) 1. To put again in the former place (*Bacon*). 2. To put in a new place (*Dryden*).

To REPLAI'T. *v. a.* (*re* and *plait*.) To fold one part often over another (*Dryden*).

To REPLA'NT. *v. a.* (*replant*, Fr.) To plant anew (*Bacon*).

REPLANTA'TION. *s.* (from *replant*.) The act of planting again.

To REPLE'NISH. *v. a.* (*repleo*, Lat.) 1. To stock; to fill (*Milton*). 2. To finish; to complete: not proper (*Shakspeare*).

To REPLE'NISH. *v. n.* To recover the former fulness: not in use (*Bacon*).

REPLE'TE. *a.* (*replete*, Fr.) Full; completely filled; filled to exuberance (*Bacon*).

REPLE'TION. *s.* (*repletion*, Fr.) The state of being over full (*Arbuthnot*).

REPLE'VIABLE. *a.* (*replegiabilis*, barbarous Lat.) What may be replevined.

To REPLE'VIN. *To* REPLE'VY. *v. a.* (*replegio*, low Lat.) To take back or set at liberty, upon security, any thing seized (*Hudibras*).

REPLEVIN, in law, is a writ by him, who has cattle or other goods distrained by another, for any cause. If he wishes to dispute the propriety of the distress, he sues this writ, and upon putting in surety to the sheriff, that upon delivery of the thing distrained, he will prosecute the action against the distrainer, the cattle or goods are delivered back, and said to be replevied. In this writ, or action, both the plaintiff and defendant are called actors; the one, that is the plaintiff, suing for damages, and the defendant, who is also called avowant, to have a return of the goods or cattle.

Replevins by writ issue properly out of Chancery, returnable into the courts of King's Bench and Common Pleas at Westminster.

After the goods are delivered back to the party replevying, he is bound to bring his action of replevin against the distrainer; which may be prosecuted in the county court, be the distress of what value it may: but either party may remove it to the superior courts of King's Bench or Common Pleas, the plaintiff at pleasure, and the defendant upon reasonable cause.

If the sheriff is shown a stranger's goods, and he takes them, an action of trespass lies against him, for otherwise he could have no remedy; for being a stranger, he cannot have the writ *de proprietate probanda*, and were he not entitled to this remedy, it would be in the power of the sheriff to strip a man's house of all his goods.

If the replevin be determined for the plaintiff, namely, that the distress was wrongfully taken, he has already got his goods back into his own possession, and shall keep them, and recover damages. But if the defendant prevail, by the default or non-suit of the plaintiff, then he shall have a writ *de returno habendo*, or to have a return, whereby the goods or chattels, which were distrained and then replevied, are returned again into his custody, to be sold, or otherwise disposed of, as if no replevin had been made. If the distress were for damage feasant, that is, for cattle breaking through fences, and coming upon the land of the party, the distrainer may keep the goods so returned, until tender shall be made of sufficient amends.

REPLICA'TION. *s.* (*replico*, Latin.) 1. Rebound; repercussion: not used (*Shakspeare*). 2. Reply; answer (*Broome*).

To REPLY'. *v. n.* (*repliquer*, French.) To answer; to make a return to an answer (*Atterbury*).

To REPLY'. *v. a.* To return for an answer (*Milton*).

REPLY'. *s.* (*replique*, Fr.) Answer; return to an answer (*Watts*).

REPLY'ER. *s.* (from *reply*.) He that makes a return to an answer (*Bacon*).

To REPO'LISH. *v. a.* (*repolir*, Fr.) To polish again (*Donne*).

To REPO'RT. *v. a.* (*rapporter*, Fr.) 1. To noise by popular rumour (*Shakspeare*). 2. To give repute (*Timothy*). 3. To give an account of (*Nehemiah*). 4. To return; to rebound; to give back (*Bacon*).

REPO'RT. *s.* (from the verb.) 1. Rumour; popular fame. 2. Repute; public character

(*Shakspeare*). 3. Account returned (*Waller*). 4. Account given by lawyers of cases (*Watts*). 5. Sound; loud noise; repercussion (*Bacon*).

REPO'RTER. *s.* (from *report.*) Relater; one that gives an account (*Hayward*).

REPO'RTINGLY. *ad.* (from *reporting.*) By common fame (*Shakspeare*).

REPO'SAL. *s.* (from *repose.*) The act of reposing (*Shakspeare*).

To REPO'SE. *v. a.* (*repono*, Latin.) 1. To lay to rest (*Milton*). 2. To place as in confidence or trust (*Rogers*). 3. To lodge; to lay up (*Woodward*).

To REPO'SE. *v. n.* (*reposer*, Fr.) 1. To sleep; to be at rest (*Chapman*). 2. To rest in confidence (*Shakspeare*).

REPO'SE. *s.* (*repos*, Fr.) 1. Sleep; rest; quiet (*Philips*). 2. Cause of rest (*Dryden*).

REPO'SEDNESS. *s.* (from *reposed.*) State of being at rest.

To REPO'SITE. *v. a.* (*repositus*, Lat.) To lay up; to lodge as in a place of safety (*Derham*).

REPOSI'TION. *s.* (from *reposite.*) The act of replacing (*Wiseman*).

REPO'SITORY. *s.* (*repositorium*, Lat.) A place where any thing is safely laid up (*Rogers*).

To REPOSSE'SS. *v. a.* (*re* and *possess.*) To possess again (*Spenser*).

REPOSTE, in the manage, the vindictive motion of a horse that answers the spur with a kick of his foot.

To REPREHE'ND. *v. a.* (*reprehendo*, Lat.) 1. To reprove; to chide (*Shakspeare*). 2. To blame; to censure (*Philips*). 3. To detect of fallacy (*Bacon*). 4. To charge with as a fault (*Bacon*).

REPREHE'NDER. *s.* (from *reprehend.*) Blamer; censurer (*Hooker*).

REPREHE'NSIBLE. *a.* (*reprehensible*, Fr.) Blamable; culpable; censurable.

REPREHE'NSIBLENESS. *s.* (from *reprehensible.*) Blamableness; culpableness.

REPREHE'NSIBLY. *ad.* (from *reprehensible.*) Blamably; culpably.

REPREHE'NSION. *s.* (*reprehensio*, Lat.) Reproof; open blame (*Hammond*).

REPREHE'NSIVE. *a.* (from *reprehend.*) Given to repoof.

To REPRESE'NT. *v. a.* (*represento*, Lat.) 1. To exhibit, as if the thing exhibited were present (*Milton*). 2. To describe; to shew in any particular character (*Addison*). 3. To fill the place of another by a vicarious character; to personate. 4. To exhibit; to show. 5. To shew by modest arguments or narrations (*Decay of Piety*).

REPRESENTA'TION. *s.* (*representation*, Fr.) 1. Image; likeness (*Stillingfleet*). 2. Act of supporting a vicarious character. 3. Respectful declaration. 4. Public exhibition.

REPRESE'NTATIVE. *a.* (*representatif*, Fr.) 1. Exhibiting a similitude (*Atterbury*). 2. Bearing the character or power of another (*Swift*).

REPRESE'NTATIVE. *s.* 1. One exhibiting the likeness of another (*Addison*). 2. One exercising the vicarious power given by another (*Blount*). 3. That by which any thing is shown (*Locke*).

The House of Commons is constituted of the representatives of the people in parliament. See PARLIAMENT.

REPRESE'NTER. *s.* (from *represent.*) 1. One who shows or exhibits (*Brown*). 2. One who bears a vicarious character (*Swift*).

REPRESE'NTMENT. *s.* (from *represent.*) Image or idea proposed, as exhibiting the likeness of something (*Taylor*).

To REPRE'SS. *v. a.* (*repressus*, Lat.) To crush; to put down; to subdue (*Pope*).

REPRE'SS. *s.* (from the verb.) Repression; act of crushing: not in use (*Government of the Tongue*).

REPRE'SSION. *s.* (from *repress.*) Act of repressing (*King Charles*).

REPRE'SSIVE. *a.* (from *repress.*) Having power to repress; acting to repress.

To REPRIE'VE. *v. a.* (*reprendre*, *repris*, Fr.) To respite after sentence of death; to give a respite (*South*).

REPRIEVE, in criminal law (from *reprendre*, to take back), is the withdrawing of a sentence for an interval of time; whereby the execution is suspended. See JUDGMENT. According to judge Blackstone, this may be, first, *ex arbitrio judicis*, either before or after judgment: as where the judge is not satisfied with the verdict, or the evidence is suspicious, or the indictment is insufficient, or he is doubtful whether the offence be within clergy; or, sometimes, if it be a small felony, or any favourable circumstances appear in the criminal's character, in order to give room to apply to the crown for either an absolute or conditional pardon. These arbitrary reprieves may be granted or taken off by the justices of gaol-delivery, although their session be finished, and their commission expired: but this rather by common usage than of strict right.

Reprieves may also be *ex necessitate legis*: as where a woman is capitally convicted, and pleads her pregnancy. Though this is no cause to stay judgment, yet it is to respite the execution till she be delivered. This is a mercy dictated by the law of nature, *in favorem prolis*; and therefore no part of the bloody proceedings in the reign of queen Mary hath been more justly detested, than the cruelty that was exercised in the island of Guernsey, of burning a woman big with child; and, when through the violence of the flames the infant sprang forth at the stake, and was preserved by the by-standers, after some deliberations of the priests who assisted at the sacrifice, they cast it into the fire as a young heretic. A barbarity which they never learned from the laws of ancient Rome; which directs, with the same humanity as our own, *quod prægnantis mulieris damnatæ pœna differatur, quoad pariat*: which doctrine has also prevailed in England, as early as the first memorials of our law will reach. In case this plea be made in stay of execution, the judge must direct a jury of twelve matrons or discreet women to inquire into the fact: and if they bring in their verdict

quick with child (for barely *with child*, unless it be alive in the womb, is not sufficient), execution shall be staid generally till the next session; and so from session to session, till either she is delivered, or proves by the course of nature not to have been with child at all. But if she once hath had the benefit of this reprieve, and been delivered, and afterwards becomes pregnant again, she shall not be entitled to the benefit of a further respite for that cause. For she may now be executed before the child is quick in the womb; and shall not, by her own incontinence, evade the sentence of justice.

Another cause of regular reprieve is, if the offender become *non compos* between the judgment and the award of execution: for, regularly, though a man be *compos* when he commits a capital crime, yet, if he becomes *non compos* after, he shall not be indicted; if after indictment, he shall not be convicted; if after conviction, he shall not receive judgment; if after judgment, he shall not be ordered for execution: for *furiosus solo furore punitur*; and the law knows not but he might have offered some reason, if in his senses, to have stayed these respective proceedings. It is therefore an invariable rule, when any time intervenes between the attainder and the award of execution, to demand of the prisoner what he hath to allege why execution should not be awarded against him; and, if he appears to be insane, the judge in his discretion may and ought to reprieve him.

To REPRIMA'ND. *v. a.* (*reprimander*, Fr.) To chide; to check; to reprehend (*Arbuthnot*).

REPRIMA'ND. *s.* (*reprimande*, Fr.) Reproof; reprehension (*Addison*).

To REPRI'NT. *v. a.* (*re* and *print.*) 1. To renew the impression of any thing (*South*). 2. To print a new edition (*Pope*).

REPRI'SAL. *s.* (*reprisalia*, low Latin.) Something seized by way of retaliation for robbery or injury (*Hayward*).

REPRI'SE. *s.* (*reprise*, French.) The act of taking something in retaliation of injury (*Dryden*).

REPRISE, or REPRIZE, at sea, is a merchant ship which, after its being taken by a corsair, privateer, or other enemy, is retaken by the opposite party. If a vessel thus retaken has been twenty-four hours in the possession of the enemy, it is deemed a lawful prize; but if it be retaken within that time, it is to be restored to the proprietor, with every thing therein, upon his allowing one-third to the vessel who made the reprise. Also if the reprise has been abandoned by the enemy, either in a tempest or from any other cause, before it has been led into any port, it is to be restored to the proprietor.

REPRISE, a lesson repeated, or a manage recommenced; as, to give breath to a horse upon the four corners of the volt, with only one reprise; that is, all with one breath.

To REPROA'CH. *v. a.* (*reprocher*, French.) 1. To censure in opprobrious terms, as a crime (*Dryden*). 2. To charge with a fault in severe language (*Milton*). 3. To upbraid in general (*Rogers*).

REPROA'CH. *s.* (*reproche*, Fr.) Censure; infamy; shame (*Milton*).

REPROA'CHABLE. *a.* (*reprochable*, Fr.) Worthy of reproach.

REPROA'CHFUL. *a.* (from *reproach.*) 1. Scurrilous; opprobrious (*Shakspeare*). 2. Shameful; infamous; vile (*Hammond*).

REPROA'CHFULLY. *ad.* (from *reproach.*) 1. Opprobriously; scurrilously (*Shakspeare*). 2. Shamefully; infamously.

RE'PROBATE. *a.* (*reprobus*, Lat.) Lost to virtue; lost to grace; abandoned (*South*).

RE'PROBATE. *s.* A man lost to virtue; a wretch abandoned to wickedness (*Taylor*).

To RE'PROBATE. *v. a.* (*reprobo*, Lat.) 1. To disallow; to reject (*Ayliffe*). 2. To abandon to wickedness and eternal destruction (*Hammond*). 3. To abandon to his sentence, without hope of pardon (*Southern*).

RE'PROBATENESS. *s.* (from *reprobate.*) The state of being reprobate.

REPROBA'TION. *s.* (*reprobation*, Fr.) 1. The act of abandoning, or state of being abandoned to eternal destruction (*Maine*). 2. A condemnatory sentence (*Dryden*).

To REPRODU'CE. *v. a.* (*re* and *produce.*) To produce again; to produce anew (*Newton*).

REPRODU'CTION. *s.* (from *reproduce.*) The act of producing anew (*Boyle*).

REPRODUCTION, in physiology, the generation of new successions of animals or vegetables from the same parent stock.

The reproduction or generation of living organized bodies is the great criterion or characteristic which distinguishes life from mechanism. Fluids may circulate in hydraulic machines, as mercury for example in the thermometer or barometer, but the power of producing an embryon that shall gradually acquire similitude to its parent distinguishes organized from inorganic matter.

The reproduction of plants and animals seems to be of two kinds, solitary and sexual: and we shall briefly notice it under this division.

Solitary reproduction occurs, among plants, in the formation of the buds of trees, and the bulbs of tulips, nearly similar to the parent, but often exhibiting a higher degree of perfection, and finally producing sexual organs, or flowers and seeds as consequent upon them.

The same fact occurs among several of the inferior kinds of animals. Thus the aphis or vine-fretter is viviparous in the spring and summer for eight or nine generations, which successively produce living descendants without sexual intercourse, and perhaps without sexual organs. In the autumn, however, the same insect brings forth males and females, and these pair together and lay eggs, which lie dormant during the winter, and are hatched by the vernal sun.

There are other instances both among animals and vegetables that, not on particular occasions alone, but constantly, reproduce by a solitary exertion of their own physical powers:

as the truffle, and perhaps the mushroom among plants, and the polype and tænia among worms, all of which are equally destitute of sexual character, and consequently altogether incapable of reproducing by sexual generation. One extremity of the tænia, or tape-worm, is said by Linnæus to grow old, whilst at the other end new animals are generated proceeding to infinity like the roots of the grasses. The microscopic animalcule called volvox globator is transparent, and carries within itself children and grandchildren to the fifth generation like the aphides; so that the progeny of the tænia is produced longitudinally in a chain-like series, and that of the volvox circularly in an included series.

There are other minute animals, again, that propagate a progeny by lateral sections, or in other words by splitting or dividing, which is the case with the hydra or polype, the hirudo viridis or green-leech, and various others; while many, of a larger kind, as oysters and perhaps eels, produce, from a common gender, a progeny which requires no maternal care to supply it with rest, nutriment, or oxygenation; and which hence again accurately resemble the production of the buds of trees, the wires of some herbaceous plants, as of knot-grass and strawberries, and the bulbs of other plants, as of onions and potatoes. There are other plants, on the contrary, that palpably possess both kinds of sexual organs, as snails and dew-worms, which nevertheless are not able to generate of their own power, but require the aid of sexual union, as in the case of the more perfect animals, with this only difference, that the male and female organs being in both instances applied to one another, each animal becomes equally impregnated. Poupart conceived that the hermaphrodite animals of different descriptions exceed in number those divided into sexes.

The most perfect mode of reproduction, however, both in animal and vegetable life, is by sexual intercourse, and the medium by which life is hence imparted and increased is uniformly that of eggs or ova; the egg being in various instances hatched in the body of the mother, and in others out of the body, either by her own vital warmth applied to it, as in the case of incubation, or by the common warmth of the sun or the surrounding atmosphere. The former mode of increase is usually denominated viviparous, and the latter oviparous production; a distinction by no means correct, and leading to erroneous views, since, as we have just observed, the egg is the common organ of life in both cases, only that in the first it is perfected and broken before the expulsion of the fetus, or embryon, and in the second not till afterwards.

The former is the process pursued in almost all mammalian animals, in several kinds of amphibials, especially the poisonous serpents; in a few fishes, of which the shark tribes furnish the most striking example; and perhaps the greater number of worms. The latter is met with in the bird class, the innoxious serpents, insects, with a single exception or two, and various worms, as some of the oscaris kind, the fluke, tape-worm, and cuttle-fish.

Perhaps the only oviparous quadrupeds, using the term oviparous in its common sense are the opossum and kangaroo. Both these animals are well known to be provided with a marsupium or pouch for the reception of the embryon or fetus as soon as it is extruded, where it remains, each attached to a distinct teat, and is allowed by the mother, as it increases in bulk, to quit it for a longer period of time, and at a greater distance, till having acquired a sufficient degree of maturity to provide for itself, it deserts its parent altogether; which by this period is not unfrequently found to be once more breeding uterinely, and stands in need of the pouch for a new progeny. Of the size and nature of this progeny, however, on its first extrusion, or of the means by which the mother introduces it into the pouch, and attaches it to a distinct teat, we know but very little. Dr. Barton of Philadelphia published a short history of the process a few years ago, so far as he had been able to collect it both from the observations of himself and other naturalists: and according to this statement, the young and minute opossum on its birth seldom exceeds three, and sometimes not a single grain; and there is much reason for supposing it to be at this time a mere embryon in its egg, which alone acquires maturity by what may be denominated marsupial incubation. The breeding process of the kangaroo appears to be of the same kind, though we cannot yet speak with certainty upon the subject, notwithstanding that this elegant animal may now be considered as naturalized in England, from a residence of some years in the royal domains at Richmond; and its having in many instances produced young in that appropriate situation.

Closely connected with this subject is the doctrine of spontaneous vitality, which has so much occupied the attention of natural philosophers in past and present ages; and upon which we can even at present only speak with great caution and doubtfulness. In general we may affirm that plants and animals only exist by parental generation either solitary or sexual, but there are various, we may almost add innumerable, instances among the lower kinds of both kingdoms in which they seem to be produced without any known or traceable parentage, and from the mere union and mutual action of perhaps given molecules in given circumstances, and which Buffon has hence denominated, unquestionably incorrectly, organic.

Such a doctrine has been supposed by many excellent persons to strike at the root of all natural order, and consequently to lead indirectly to atheism, or the disbelief of a governing and infinitely wise intelligence. But this is a mere chimæra; for the mode by which such productive molecules operate, admitting them to exist and operate at all, may be, and must be, rigidly subject to a system of law, and consequently as strongly in proof, were we acquainted

with the nature of the law, of a supreme intelligent power, as the process of ordinary generation: and hence the production of monsters of every possible form and deformity must be as effectually guarded against by the admission as by the rejection of such a system. There are however various and innumerable difficulties upon the subject which way soever we turn, and the lesson they should chiefly teach us is to be modest in our own opinions, and charitable to those of others. Let us point out a few of those productions, before we conclude, to which we principally allude, and which seem to press heaviest upon the theory of universal parental generation.

Of the numerous tribes of hydatids that are found in the brain, digestive organs, and muscles of different animals, each distinct kind is only found in its own particular nidus, and the moment it is removed it dies. Who can determine the means by which the egg or embryon (admitting such to exist) can possibly be conveyed from the same organ in one individual to the same organ in another? or who is there that can conceive that any such material is conveyed at all? The fasciola hepatica or common fluke is found in the liver of sheep, and only moreover when the animal is labouring under the disease called the rot; but whether the cause or the effect of this disease is unknown. By what means can this animal be introduced into such a situation?

According to the experiments of Buffon, Reaumur, Ellis, Ingenhouz, and others, microscopic animals are produced in three or four days (according to the warmth of the season) in the infusions of all vegetable or animal matter. By some of these experimenters, boiling veal broth was put into a phial, previously heated in the fire, and sealed up hermetically or with melted wax, yet in three or four days it was observed to be full of animalcules.

Some of these seem, after such apparently spontaneous production, to have a power of generating others like themselves by solitary reproduction without sex, in the same manner as vegetable seedlings which at first are only capable of generating by solitary reproduction, as buds or bulbs, afterwards rear perfect flowers, and give birth to the different sexes. Mr. Ellis, in Phil. Trans. vol. lix. gives drawings of six kinds of infusory animalcules which increase into two animals by dividing across the middle. Thus in paste composed of flour and water, which has been suffered to become acescent, the animalcules called infusory eels, vibrio anguillula, are seen in great abundance: their motions are rapid and strong; they are viviparous, and produce at intervals a numerous progeny: similar animals are found in vinegar. These eels were probably at first as minute as other microscopic animalcules; but by frequent, perhaps hourly reproduction, they have gradually become the large animals now described, possessing great strength and activity.

To suppose the eggs of the first series of these animalcules to float in the atmosphere, and to pass through the sealed glass phial, is so contrary to all we know of nature as to be totally incredible; and as the next series are viviparous, it is equally absurd to suppose that their parents float universally in the atmosphere to lay their young in an appropriate nidus. This in truth in the case of many of the hydatids, flukes, and other worms, we know to be impossible, because we know that they cannot exist out of the peculiar viscera in which they are traced, and die as soon as the attempt is made.

There are some vegetables that appear to be produced in the same manner, and which, at least in one instance, is propagated and enlarged in so short a time by solitary generation, as to become visible to the naked eye; the instance we particularly allude to is the conferva fontinalis or green matter on the surface of stagnant water, first attended to by Dr. Priestley. The proofs that this material is a vegatable are derived from its giving forth so much oxygen when exposed to the sun-shine, and from its green colour. Dr. Ingenhouz asserts that by filling a bottle with well-water, and inverting it immediately into a basin of well-water, this green vegetable is formed in great quantity; and he believes that the water itself, or some substance contained in the water, is converted into this kind of vegetation, which then quickly propagates itself. Mucor or mouldiness, the minute beginnings of the growth of which Mr. Ellis first accurately noticed by his microscope, near the surface of all putrefying animal or vegetable matter, is a plant that appears to be produced somewhat in the same manner, and with the same rapidity, its vegetation being so quick as to be almost seen, and soon becoming so large as to be completely visible to the naked eye. It is difficult to conceive how the seeds of this mucor can float so universally in the atmosphere, as to fix itself on all putrid matter in all places. There are various other fungi that seem to originate in a similar way; as those growing in close wine-vaults, from decaying trees, or rotten timber. Such also may perhaps be the common esculent mushroom, which as Kennedy observes may be produced from horsedung at any time, and in any place.

REPROO'F. *s.* (from *reprove.*) 1. Blame to the face; reprehension (*Pope*). 2. Censure; slander: out of use (*Psalms*).

REPRO'VABLE. *a.* (from *reprove.*) Culpable; blamable; worthy of reprehension.

To REPRO'VE. *v. a.* (*reprover*, French.) 1. To blame; to censure (*Psalms*). 2. To charge to the face with a fault; to check; to chide; to reprehend (*Taylor*). 3. To refute; to disprove (*Shakspeare*). 4. To blame for (*Carew*).

REPRO'VER. *s.* (from *reprove.*) A reprehender; one that reproves (*South*).

To REPRU'NE. *v. a.* (*re* and *prune.*) To prune a second time (*Evelyn*).

RE'PTILE. *a.* (*reptile*, Lat.) Creeping upon many feet (*Gay*).

RE'PTILE. *s.* An animal that creeps upon many feet. See REPTILIA.

REPTILIA. Reptiles. In zoology, the first order of Linnéus's class amphibia, characterised ordinarily by their having feet, and flat naked ears without auricles. See AMPHIBIOLOGY and ZOOLOGY.

Of these there are five genera, viz.

Testudo,	Draco,
Lacerta,	Rana,
Siren.	

REPTON, a village in Derbyshire, eight miles S.S.W. of Derby, celebrated as the burial-place of several of the Saxon kings of Mercia, and for several antiquities. Here is a noted free-school, which appears to have been the refectory of a priory.

REPUBLIC. (*respublica*, commonwealth.) A popular state or government; or a nation where the body, or only a part of the people, have the government in their own hands. When the body of the people is possessed of the supreme power, this is called a democracy. When the supreme power is lodged in the hands of a part of the people, it is then an aristocracy.

The celebrated republics of antiquity are those of Athens, Sparta, Rome, and Carthage. At present there is scarce any such thing as a real republic; i. e. a strictly popular state. Holland, which, till within these few years, consisted of about fifty republics, was then a confederate republic. But it has lately been moulded into a kingdom, to suit the pleasure of the present emperor of France.

REPUBLIC OF LETTERS, is a phrase used in speaking collectively of the whole body of the people of study and learning.

There is a journal, begun in Holland by M. Bayle, and continued by M. Bernard, consisting of extracts of books printed in the course of the year, called Nouvelles de la Republique des Lettres, News from the Republic of Letters.

REPU'BLICAN. *a.* (from *republic.*) Placing the government in the people.

REPU'BLICAN. *s.* (from *republic.*) One who thinks a commonwealth without monarchy the best government (*Addison*). 2. One who is under a republican form of government.

REPU'DIABLE. *a.* (from *repudiate.*) Fit to be rejected.

To REPU'DIATE. *v. a.* (*repudio*, Latin.) To divorce; to reject; to put away (*Bentley*).

REPUDIA'TION. *s.* (from *repudiate.*) Divorce; rejection (*Arbuthnot*).

REPU'GNANCE. REPU'GNANCY. *s.* (*repugnance*, French.) 1. Inconsistency; contrariety (*Bentley*). 2. Reluctance; resistance (*Shakspeare*). 3. Struggle of opposite passions (*South*). 4. Aversion; unwillingness (*Dryden*).

REPU'GNANT. *a.* (*repugnant*, Fr.) 1. Disobedient; not obsequious (*Shakspeare*). 2. Contrary; opposite (*Woodward*).

REPU'GNANTLY. *ad.* Contradictorily (*Brown*).

To REPU'LLULATE. *v. n.* (*repulluler*, French.) To bud again (*Howel*).

REPU'LSE. *s.* (*repulse*, Fr. *repulsa*, Lat.) The condition of being driven off or put aside from any attempt (*King Charles*).

To REPU'LSE. *v. a.* (*repulsus*, Latin.) To beat back; to drive off (*Knolles*).

REPU'LSION. *s.* (*repulsus*, Latin.) The act or power of driving off from itself (*Arbuthnot*).

REPULSION, in physics, that property in bodies, whereby, if they are placed just beyond the sphere of each other's attraction of cohesion, they mutually fly from each other. Thus, if an oily substance, lighter than water, be placed on the surface thereof, or if a piece of iron be laid upon mercury, the surface of the fluid will be depressed about the body laid on it: this depression is manifestly occasioned by a repelling power in the bodies, which hinders the approach of the fluid towards them. But it is possible, in some cases, to press or force the repelling bodies into the sphere of one another's attraction; and then they will mutually tend towards each other, as when we mix oil and water till they incorporate. Dr. Knight defines repulsion to be that cause which makes bodies mutually endeavour to recede from each other, with different forces, at different times; and that such a cause exists in nature, he thinks evident for the following reasons. 1. Because all bodies are electrical, or capable of being made so; and it is well known, that electrical bodies both attract and repel. 2. Both attraction and repulsion are very conspicuous in all magnetical bodies. 3. Sir Isaac Newton has shown from experiments, that the surfaces of two convex glasses repel each other. 4. The same great philosopher has explained the elasticity of the air, by supposing its particles mutually to repel each other. 5. The particles of light are, in part at least, repelled from the surfaces of all bodies. 6. Lastly, it seems highly probable that the particles of light mutually repel each other, as well as the particles of air. The same gentleman ascribes the cause of repulsion, as well as that of attraction, to the immediate effect of God's will; and as attraction and repulsion are contraries, and consequently cannot, at the same time, belong to the same substance, the doctor supposes there are in nature two kinds of matter, one attracting, the other repelling; and that those particles of matter which repel each other, are subject to the general law of attraction in respect of other matter. A repellent matter being thus supposed, equally dispersed through the whole universe, the doctor attempts to account for many natural phænomena by means thereof. He thinks light is nothing but this repellent matter put into violent vibrations, by the repellent corpuscles which compose the atmosphere of the sun and stars: and that, therefore, we have no reason to believe they are gulphs of fire, but, like the rest of the heavenly bodies, inhabitable worlds. From the same principles, he attempts to explain the nature of fire and heat, the various phænomena of the magnet, and the cause of the variation of the needle: and, indeed, it is

difficult, if not impossible, by the doctrine of attraction alone, to account for all the phænomena observable in experiments made with magnets, which may now be solved by admitting this doctrine of a repellent fluid; but whether it will be sufficient to account for all the particular phænomena of nature which are the proper tests of an hypothesis, time and experience alone must determine. The doctor also endeavours to show, that the attractions of cohesion, gravity, and magnetism, are the same, and that by these two active principles, viz. attraction and repulsion, all the phænomena of nature may be explained; but as his ingenious treatise on this subject is laid down in a series of propositions, all connected together, it would be impossible to do justice to his arguments without transcribing the whole: we shall therefore refer the curious to the book itself.

According to 's Gravesande and others, when light is reflected from a polished spherical surface, the particles of light do not strike upon the solid parts, and so rebound from them; but are repelled from the surface, at a small distance before they touch it, by a power extended all over the said polished surface. And sir Isaac Newton observes, that the rays of light are also expelled by the edges of bodies, as they pass near them; so as to make their shadows, in some cases, larger than they would otherwise be.

REPULSION, in chemistry. Sir Isaac Newton demonstrated, that if this law be correct, then the force, by which the particles of air recede from each other, increases or diminishes at the same rate that the distance between the centres of the particles, or atoms, of which it is composed, diminishes or increases; or, which is the same thing, that the repulsion between the particles of gaseous bodies is always inversely as the distance of their centres from each other. Now the distance between the centres of the atoms of elastic fluids always varies as the cube root of their density, taking the word in its common acceptation. Thus, if the density of air, under the mean pressure of the atmosphere, be supposed 1; if it be forced into $\frac{1}{8}$th of its bulk, its density becomes 8. In these two cases we have the distance between the atoms of air inversely as the cube root of 1, to the cube root of 8, or as 1 to 2. So that if air be compressed into $\frac{1}{8}$th of its bulk, the distance between its particles is reduced to one half, and of course the repulsion between them is doubled. If air be rarified 300 times, we have its density reduced to $\frac{1}{300}$th of that of common air. Here we have the distance between the atoms of common and the rarified air, as $\sqrt[3]{1} : \sqrt[3]{300}$, or nearly as 1 : 7. So that when air is rarified 300 times, the distance between its particles becomes almost seven times greater, and of course their repulsion is diminished almost sevenfold.

REPU'LSIVE. *a.* (from *repulse.*) Driving off; having the power to beat back (*Newton*).

To REPU'RCHASE. *v. a.* (*re* and *purchase.*) To buy again (*Shakspeare*).

REPUTABLE. *a.* (from *repute.*) Honourable; not infamous (*Rogers*).

REPUTABLY. *ad.* (from *reputable.*) Without discredit (*Atterbury*).

REPUTA'TION. *s.* (*reputation*, French.) 1. Character of good or bad (*Addison*). 2. Credit; honour (*Pope*).

To REPU'TE. *v. a.* (*reputo*, Lat.) To hold; to account; to think (*Donne*).

REPU'TE. *s.* (from the verb.) 1. Character; reputation. 2. Established opinion (*Milton*).

REPU'TELESS. *a.* (from *repute.*) Disreputable; disgraceful (*Shakspeare*).

REQUENA, a town of Spain, in New Castile, with a castle, and a considerable manufacture of silks. It was taken by the English in 1706, and retaken by the French the next year. It is seated on a hill, between the river Oliana and a ridge of mountains on the borders of Valencia, 64 miles E.S.E. of Cuenza. Lon. 1. 9 W. Lat. 39. 44 N.

REQUE'ST. *s.* (*requeste*, French.) 1. Petition; entreaty (*Shakspeare*). 2. Demand; repute; credit (*Boyle*).

To REQUE'ST. *v. a.* (*requester*, Fr.) To ask; to solicit; to entreat (*Knolles*).

REQUE'STER. *s.* (from *request.*) Petitioner; solicitor.

REQUESTS (Court of), *curia requisitionum* was a court of equity, of the same nature with the court of chancery, but inferior to it; principally instituted for the relief of such petitioners as in conscionable cases addressed themselves by supplication to his majesty. Of this court the lord privy-seal was chief judge, assisted by the masters of requests; and it had beginning about the 9 Hen. VII. according to sir Julius Cæsar's tractate upon this subject: though Mr. Gwyn, in his preface to his Readings, saith it began from a commission first granted by king Henry VIII.—This court having assumed great power to itself, so that it became burthensome, Mich. anno 40 and 41 Eliz. in the court of common pleas it was adjudged upon solemn argument, that the court of requests was no court of judicature, &c. and by stat. 16 and 17 Car. I. c. 10. it was taken away.

To REQUI'CKEN. *v. a.* (*re* and *quicken.*) To reanimate (*Shakspeare*).

RE'QUIEM. *s.* (Latin.) 1. A hymn in which they implore for the dead *requiem* or rest (*Shakspeare*). 2. Rest; quiet; peace: not in use (*Sandys*).

REQUI'RABLE. *a.* (from *require.*) Fit to be required (*Hale*).

To REQUI'RE. *v. a.* (*requiro*, Latin.) 1. To demand; to ask a thing as of right (*Shakspeare*). 2. To make necessary; to need (*Dryden*).

RE'QUISITE. *a.* (*requisitus*, Lat.) Necessary; needful; required by the nature of things (*Dryden*).

RE'QUISITE. *s.* Any thing necessary (*Dryden*).

RE'QUISITELY. *ad.* (from *requisite.*) Necessarily; in a requisite manner (*Boyle*).

RE'QUISITENESS. *s.* (from *requisite.*) Necessity; the state of being requisite (*Boyle*).

REQUI'TAL. *s.* (from *requite.*) 1. Return for any good or bad office; retaliation (*Hooker*). 2. Return; reciprocal action (*Waller*). 3. Reward; recompense (*South*).

To REQUI'TE. *v. a.* (*requiter*, French.) 1. To repay; to retaliate; to recompense. 2. To do or give in reciprocation (*Samuel*).

To RESAI'L. *v. a.* (*re* and *sail.*) To sail back (*Pope*).

RESA'LE. *s.* (*re* and *sale.*) Sale at second hand (*Bacon*).

To RESALU'TE. *v. a.* (*resaluto*, Latin; *resaleur*, Fr.) To salute or greet anew (*Chapman*).

To RESCI'ND. *v. a.* (*rescindo*, Lat. *rescinder*, Fr.) To cut off; to abrogate a law (*Dryden*).

RESCI'SSION. *s.* (*rescission*, Fr. *rescissos*, Lat.) The act of cutting off; abrogation (*Bacon*).

RESCI'SSORY. *a.* (*rescissioire*, French; *rescissus*, Latin.) Having the power to cut off.

To RESCRI'BE. *v. a.* (*rescribo*, Latin.) 1. To write back (*Ayliffe*). 2. To write over again (*Howel*).

RE'SCRIPT. *s.* (*rescriptum*, Latin.) Edict of an emperour (*Bacon*).

To RE'SCUE. *a. a.* (*rescorre*, old Fr.) To set free from any violence, confinement, or danger (*Shakspeare*).

RE'SCUE. *s.* (*rescousse*, old Fr.) Deliverance from violence, danger, or confinement (*Shakspeare*).

RESCUE, or RESCOUS, is the taking away and setting at liberty, against law, any distress taken for rent, or services, or damage feasant; but the more general notion of rescous is, the forcibly liberating another from an arrest or some legal commitment. This is a high offence, and subjects the offender not only to an action at the suit of the party injured, but likewise to fine and imprisonment at the suit of the king. If goods are distrained without cause, or contrary to law, the owner may make rescue; but if they are once impounded, even though taken without any cause, the owner may not break the pound and take them out, for then they are in custody of the law.

RE'SCUER. *s.* (from *rescue.*) One that rescues.

RESEA'RCH. *s.* (*recherche*, Fr.) Inquiry; search (*Rogers*).

To RESEA'RCH. *v. a.* (*rechercher*, French.) To examine; to inquire (*Wotton*).

To RESEA'T. *v. a.* (*re* and *seat.*) To seat again (*Dryden*).

RESEDA. Dyers' weed; weld; wild-wood; yellow weed. In botany, a genus of the class dodecandria, order trigynia. Calyx one-leafed, divided; petals jagged; capsule superior, open at top, one-celled, many-seeded. Thirteen species—scattered over the globe; two indigenous to our own country.

The following are chiefly entitled to notice:

1. R. luteola. Common weld, or dyers' weed. Stalk a yard high, terminating in a long naked spike of yellowish-green flowers; leaves lanceolate, entire, flat; calyx in four segments. Found wild amidst rubbish, and in the wastes of our own country; but much cultivated on account of its great utility in dyeing silk and wool of a yellow colour, for which see the article DYEING.

It grows without trouble, on the poorest soils; and is commonly sown along with, or immediately after barley or oats, without farther trouble than drawing a harrow or bush over the seeds. The reaping the corn does it no injury, as it grows but little the first year; but is pulled the next summer and dried like flax. The seed or stalk, however, are often damaged by pulling the plant too green, or letting it remain too long.

2. R. odorata. Mignonette; sweet reseda. Root composed of many strong fibres, running deeply into the ground; stems small, about a foot long, dividing into many small branches; leaves entire, three-lobed; calyx as long as the petals; styles often four; flowers produced in loose spikes terminal on the branches; corols of an herbaceous white colour and fine odour. A native of Barbary; flowers from June to winter; and is biennial. It is raised from seeds, which should be sown on a moderate hot-bed in March; and when the plants are strong enough they should be pricked out into another moderate hot-bed. They may be preserved through the winter in a green-house.

RESE'IZER. *s.* One that seizes again.

RESEI'ZURE. *s.* (*re* and *seizure.*) Repeated seizure; seizure a second time (*Bacon*).

RESE'MBLANCE. *s.* (*resemblance*, Fr.) Likeness; similitude; representation (*Hooker*).

To RESE'MBLE. *v. a.* (*resembler*, French.) 1. To compare; to represent as like something else (*Raleigh*). 2. To be like; to have likeness to (*Addison*).

To RESE'ND. *v. a.* (*re* and *send.*) To send back; to send again: not used (*Shakspeare*).

To RESE'NT. *v. a.* (*resentir*, French.) 1. To take well or ill (*Bacon*). 2. To take ill; to consider as an injury or affront. The most usual sense (*Milton*).

RESE'NTER. *s.* (from *resent.*) One who feels injuries deeply (*Wotton*).

RESE'NTFUL. *a.* (*resent* and *full.*) Malignant; easily provoked to anger, and long retaining it.

RESE'NTINGLY. *ad.* (from *resenting.*) 1. With deep sense; with strong perception (*More*). 2. With continued anger.

RESE'NTMENT. *s.* (*resentiment*, French.) 1. Strong perception of good or ill (*Glanville*). 2. Deep sense of injury (*Swift*).

RESERVA'TION. *s.* (*reservation*, French.) 1. Reserve; concealment of something in the mind (*Sanderson*). 2. Something kept back; something not given up (*Swift*). 3. Custody; state of being treasured up (*Shakspeare*).

RESERVATION (Mental), a proposition which, strictly taken, and according to the natural import of the terms, is false; but, if qua-

lified by something concealed in the mind, becomes true. Mental reservations are the great refuge of religious hypocrites, who use them to accommodate their consciences with their interests: the Jesuits are zealous advocates for mental reservations; yet are they real lies, as including an intention to deceive.

RESE'RVATORY. *s.* (*reservoir*, French.) Place in which any thing is reserved or kept (*Woodward*).

To RESE'RVE. *v. a.* (*reserver*, French.) 1. To keep in store; to save to some other purpose (*Spenser*). 2. To retain; to keep; to hold (*Shakspeare*). 3. To lay up to a future time (*Decay of Piety*).

RESE'RVE. *s.* (from the verb.) 1. Store kept untouched (*Locke*). 2. Something kept for exigence (*Tillotson*). 3. Something concealed in the mind (*Addison*). 4. Exception; prohibition (*Milton*). 5. Exception in favour (*Rogers*). 6. Modesty; caution in personal behaviour (*Prior*).

RESERVE (Body of), or CORPS DE RESERVE, in military affairs, the third or last line of an army, drawn up for battle; so called because they are reserved to sustain the rest as occasion requires, and not to engage but in case of necessity.

RESE'RVED. *a.* (from *reserve.*) 1. Modest; not loosely free (*Walsh*). 2. Sullen; not open; not frank (*Dryden*).

RESE'RVEDLY. *ad.* (from *reserved.*) 1. Not with frankness; not with openness; with reserve (*Woodward*). 2. Scrupulously; coldly.

RESE'RVEDNESS. *s.* Closeness; want of frankness; want of openness (*South*).

RESE'RVER. *s.* (from *reserve.*) One that reserves.

RESERVOI'R. *s.* (*reservoir*, Fr.) Place where any thing is kept in store (*Pope*).

To RESE'TTLE. *v. a.* (*re* and *settle.*) To settle again (*Swift*).

RESE'TTLEMENT. *s.* (from *resettle.*) 1. The act of settling again (*Norris*). 2. The state of settling again (*Mortimer*).

RESHT, a city of Persia, capital of Ghilan. It has a considerable trade, particularly in silk; and much rice grows in the environs. It is seated on a river, six miles from the Caspian sea, and 100 N. of Casbin. Lon. 51. 80 E. Lat. 37. 58 N.

RESI'ANCE. *s.* (from *resiant.*) Residence; abode; dwelling (*Bacon*).

RESI'ANT. *a.* (*resseant*, Fr.) Resident; present in a place (*Knolles*).

To RESI'DE. *v. n.* (*resideo*, Latin; *resider*, French.) 1. To have abode; to live; to dwell; to be present (*Milton*). 2. (*resido*, Latin.) To sink; to subside; to fall to the bottom (*Boyle*).

RE'SIDENCE. *s.* (*residence*, French.) 1. Act of dwelling in a place (*Hale*). 2. Place of abode; dwelling (*Milton*). 3. (from *resido*, Latin.) That which settles at the bottom of liquors (*Brown*).

RE'SIDENT. *a.* (*residens*, Lat.) Dwelling or having abode in any place (*Burnet*).

RE'SIDENT. *s.* (from the adj.) An agent, minister, or officer residing in any distant place with the dignity of an ambassador (*Addison*).

RESIDE'NTIARY. *a.* (from *resident.*) Holding residence (*More*).

RESI'DUAL. RESI'DUARY. *a.* (from *residuum*, Latin.) Relating to the residue; relating to the part remaining (*Ayliffe*).

RESIDUAL FIGURE, in geometry, the figure remaining after subtracting a lesser from a greater.

RESIDUAL ROOT, in algebra, a root composed of two parts or members, connected together by the sign —. Thus $x-y$ is a residual root, so called, because its value is no more than the difference between its parts x and y.

RESIDUARY LEGATEE, is he to whom the residue of a personal estate is given by will; and such legatee being made executor with others, shall retain against the rest. If there is no residuary clause in a will, all the property which is not particularly devised goes to the executor, if it is personal; but, if real, to the heir.

RE'SIDUE. *s.* (*residuum*, Latin.) The remaining part; that which is left (*Arbuthnot*).

To RESIE'GE. *v. a.* (*re* and *siege*, French.) To seat again: obsolete (*Spenser*).

To RESI'GN. *v. a.* (*resigno*, Latin.) 1. To give up a claim or possession (*Denham*). 2. To yield up (*Locke*). 3. To give up in confidence (*Tillotson*). 4. To submit; particularly to submit to providence (*Dryden*). 5. To submit without resistance or murmur (*Shakspeare*).

RESIGNA'TION. *s.* (*resignation*, French.) 1. The act of resigning or giving up a claim or possession (*Hayward*). 2. Submission; unresisting acquiescence (*Addison*). 3. Submission without murmur to the will of God.

RESI'GNER. *s.* (from *resign.*) One that resigns.

RESI'GNMENT. *s.* (from *resign.*) Act of resigning.

RESI'LIENCE. RESI'LIENCY. *s.* (from *resilio*, Latin.) The act of starting or leaping back (*Bacon*).

RESI'LIENT. *a.* (*resiliens*, Latin.) Starting or springing back.

RESILI'TION. *s.* (*resilio*, Lat.) The act of springing back; resilience.

RESIN (Black). See RESINA NIGRA.

RESIN (Elastic). See INDIAN RUBBER.

RESIN-TREE (Elastic). See INDIAN RUBBER, and CAOUTCHOUC.

RESIN (White). See RESINA FLAVA.

RESIN (Yellow). See RESINA FLAVA.

RESINA FLAVA. Resina alba. Yellow resin is what remains in the still after distilling oil of turpentine, by adding water to the common turpentine. It is of very extensive use in surgery as an active detergent, and forms the base of the unguentum resinæ flavæ.

RESINA LUTEA NOVI BELGII. Botany-bay gum. All the information that has been

hitherto collected respecting the history of the yellow gum is the following:

The plant that produces it is low and small, with long grassy leaves; but the fructification of it shoots out in a singular manner from the centre of the leaves, on a single straight stem, to the height of twelve or fourteen feet. Of this stem, which is strong and light, like some of the reed class, the natives usually make their spears. The resin is generally dug up out of the soil under the tree, not collected from it, and may perhaps be that which Tasman calls gum lac of the ground.

Mr. Boles, surgeon of the Lady Penrhyn, gives a somewhat different account; and as this gentleman appears to have paid considerable attention to the subject, his account may certainly be relied upon. After describing the tree in precisely the same manner as above, he observes, that at the top of the trunk of the tree, long grassy leaves grow in great abundance. The gum is found under these leaves in considerable quantities; it commonly exudes in round tears, or drops, from the size of a large pea to that of a marble, and sometimes much larger. These are by the heat of the sun frequently so much softened, that they fall on the ground, and in this soft state adhere to whatever they fall upon; hence the gum is frequently found mixed with dirt, wood, the bark of the tree, and various other substances: so that one lump has been seen composed of many small pure pieces of various sizes united together, which weighed nearly half a hundred weight. It is produced in such abundance, that one man may collect thirty or forty pounds in the space of a few hours. The convicts have another method of collecting it; they dig round the tree, and break off pieces of the roots which always have some, and frequently considerable quantities of the gum in them. This gum appears nearly, but not entirely, the same as that which exudes from the trunk of the tree; the former is often mixed with a strong smelling resinous substance of a black nature, and is so interwoven in the wood itself, that it is with difficulty separated. The latter appears a pure unmixed resinous substance.

Several experiments have been made principally with the view of determining what menstruum would dissolve the gum the most readily, and in the greatest quantity. The following table offers the general results, the quantity of each menstruum being an ounce,

	℥	ʒ	℈	gr.
Alcohol	2			
Rectified sp.	2			
Ether	1	3		
Sp. eth. vitr.	1	3		
Sp. eth. nitr.	1	3		
Brandy		7		
Lixiv. sapon.		1		
Cyder			1	5
Calcavalla				18
Calc. viv. et aqua				10
Port				8½
Ol. tereb.				4½
Water				4
Aq. kali.				3
Aq. ammon p.				2
Acid. vitr. dil.				2
Acid. nitr. dil.				2
Acet. dist.				2
Aq. calcis				2
Ol. oliv.				2

The diseases in which this resin is administered, are those of the primæ viæ, and principally such as arise from spasm, a debility, a loss of tone, or a diminished action in the muscular fibres of the stomach and bowels, such as loss of appetite, sickness, vomiting, flatulency, heart-burn, pains in the stomach, &c. when they were really idiopathic complaints, and not dependent upon any disease in the stomach, or affections of other parts of the body communicated to the stomach. In debilities and relaxations of the bowels, and the symptoms from thence arising, such as purging and flatulency, it has been found of good effect. In certain cases of diarrhæa, however (and it seemed those in which an unusual degree of irritability prevailed), it did not answer so well, unless given in small doses, and combined with opiates, when the patient seemed to gain greater advantage than when opiates only were had recourse to. In case of amenorrhæa, depending on (what most of those cases do depend upon), a sluggishness, a debility, and flaccidity of the system, this medicine, when assisted by proper exercise and diet, has, by removing the symptoms of dyspepsia, and by restoring the tone and action of the muscular fibres, been found very serviceable. This medicine does not, in the dose of about half a drachm, appear to possess any remarkably sensible operation. It neither vomits, purges, nor binds the belly, nor does it materially increase the secretion of

urine or perspiration. It has indeed sometimes been said to purge, and at others to occasion sweating, but they are not constant effects, and when they are not constant effects, and when they do occur, it generally depends on some accidental circumstance. It should seem to possess in a very extensive degree the property of allaying morbid irritability, and of restoring tone, strength, and action, to the debilitated and relaxed fibre. When the gum itself is given, it should always be the pure unmixed part; if given in the form of a draught, it should be mixed in water with mucilage of gum arabic; if made into pills, a small portion of castile soap may be employed; it was found the lixiv. sapon. dissolved it entirely. It is commonly, however, made into a tincture by mixing equal parts of the gum and rectified spirit; one drachm of this tincture (containing half a drachm of the pure gum), made into a draught with water and syrup, by the assistance of 15 grains of gum arabic in mucilage, forms an elegant medicine, and at the same time very palatable.

Resina nigra. Colophonia. What remains in the retort after distilling the balsam of turpentine from the common turpentine.

Resin. (*Harze*, Germ.) A generic name for a great variety of substances of very different qualities and texture that exsude spontaneously or are extracted by incisions made in the bark of the resinous trees, and most of which acquire more or less hardness by exposure to the atmosphere. A further portion of the same material may also be extracted artificially, and by the aid of chemistry, from the tree that produces it. Resin is also very generally met with in certain parts of vegetables, though its quantity is so small, or its combination with other constituent parts so strong, as not to appear in its proper form till extracted by chemical analysis. Thus the bark of the cinchona (Peruvian bark-tree) contains no inconsiderable quantity of resin, though none appears to the eye on mere inspection, or probably could be extracted by incision through the living tree.

The chemical properties which are usually understood to characterize a resin are the following: it is first softened and then melted by heat; and when kindled it burns readily with a strong and generally a fragrant smell, with copious flame and smoke, and leaves scarcely any residue behind. It is insoluble in water, and most watery liquids; and is not easily acted on by acids or alkalis, except they are concentrated, and the action assisted by heat or long digestion. But it readily and totally dissolves in alkohol, forming a clear but coloured solution from which by far the greater part of the resin is precipitated in a pulverulent form unaltered, by the addition of water, which immediately renders the solution opake and turbid. It is also soluble in sulphuric ether, and in the fixed and volatile oils, particularly the latter.

But though all resins agree in the qualities of inflammability, insolubility in water, and solubility in alkohol, there are several other circumstances which have usually been employed to distinguish the classes of resins.

Balsams, according to the ancient sense of the word, was certainly applied simply to those resins that always remained in a fluid, or semi-fluid state, such as the balsam of Capivi, of Mecca, of Canada: and these appear to be resins holding a superabundance of essential oil; so that when distilled *per se*, a vast quantity of oil arises, and a hard brittle resin is left behind if the heat employed is only moderate. Thus turpentine, which is a natural balsam, yields by distillation abundance of the oil of turpentine, while common rosin, which is a true resin, is left behind.

The term balsam, however, has of late years been injudiciously applied in the modern chemical nomenclature, to those two or three species of resins that contain a notable quantity of benzoic acid, as styrax and what is called balsam of Tolu.

Gum resins are natural mixtures of a true resin with another substance apparently of the nature of gum, and soluble in water. Hence if they are triturated with water they remain suspended in it in pretty intimate mixture for a considerable time, forming an opake emulsive liquor. By standing, however, the resin subsides, and the liquor becomes clear, but it retains the flavour and smell of the gum resin, and leaves, on evaporation, a small quantity of brown extractive matter. Gum-ammoniac is an example of this kind. This distinction, however, is not very precise, and is more useful in pharmacy than in pure chemistry.

There are some substances, evidently resinous in their nature and origin, which have other peculiar properties that cause them to be excluded from the list of resins; as camphor, caoutchouc, copal, and perhaps amber. And hence though no classification will correctly correspond with their chemical properties, the limits between the resins and gum-resins not being very precise, we may usefully arrange the greater part of these substances under the head of *liquid resins* or *balsams*, *solid resins*, and *gum resins*. The two first classes are entirely or almost entirely insoluble in water, unless they contain benzoic acid, but are totally soluble in alkohol. Distillation with water extracts from the liquid resins a quantity of essential oil, and leaves a residue much resembling the solid resins. The gum-resins are partly soluble in water and partly in alkohol.

Liquid resins.—1. Turpentines. Under this name we may include all the liquid resins exfuding from the different species of pine, which from their importance in the arts and the immense consumption of them will be separately described under the article Turpentine.

They all yield abundance of the limpid essential oil of turpentine when distilled, and by different modes of preparation furnish several varieties of rosin, pitch, tar, &c.

There are at least four species of turpentines commonly known in the shops, the Chio, Venice, and common turpentine, and the Canada balsam.

2. Balsam of Capivi or Copaiba is a clear yellowish resinous juice, about the consistence of thin treacle, which flows in considerable quantity from incisions made in the bark of a large tree of South America, the copaifera officinalis. This balsam has a very agreeable smell, and a pungent bitterish taste. It grows stiffer by long keeping, but never concretes into a solid. It dissolves totally in alcohol.

When distilled with water it yields nearly half of its essential oil, and a little inodorous resin is left. It appears therefore to be a natural combination, simply of resin and essential oil.

3. Balsam of Mecca. Opobalsam, or balsam of Gilead. This is a liquid resin which exsudes from the amyris opobalsamum, a small ever-green tree

that grows in many parts of the Levant, and also in great perfection on the shores of the Red Sea. It bears an extremely high price among the Turks, who employ it chiefly as a cosmetic, and it is scarcely ever found genuine in any part of Europe.

It is moderately fluid, of a yellowish white colour, very fragrant, and of a slightly bitter taste. Its chemical properties closely resemble those of the last-mentioned species, and it is only mentioned in this place on account of the extravagant value which the Turks set upon it, which is far beyond that of all the other aromatics.

4. Balsam of Peru. This is a dark-brown balsam of the consistence of thin honey, obtained from the myroxylon peruiferum (as it is said) by boiling the twigs and bark in water, and when cold, the balsam swims at the top of the liquor and is skimmed off. There appears to be two species of this balsam, the white and the brown, but the latter is the only one commonly known. This juice has a very fragrant smell and pungent taste. It is entirely immissible with water and with the fixed oils, but dissolves in the essential oils, and in alcohol. When this balsam has long remained at rest in any vessel, it deposits crystals, from which the benzoic acid may be obtained by sublimation. By distillation with water this balsam yields $\frac{1}{16}$ of its weight of an essential oil, of a reddish colour, and a pungent taste. This oil probably also contains benzoic acid. When completely charred by sulphuric acid, Mr. Hatchett found 100 grs. to yield 64 grs. of mere charcoal. A compound tincture of this balsam forms the common friers balsam, used as an application in cuts and slight wounds.

5. Balsam of Tolu. This juice flows from incisions made in the trunk of the Toluifera balsamum, a large tree resembling the pine which abounds in the province of Tolu, in South America: it is of a yellowish brown colour, and when fresh of a thick tenacious consistence, but by age it hardens so as to be moderately brittle in cold weather. This balsam has a most fragrant smell, more so than most of the resins, somewhat resembling lemons. When chewed it clings to the teeth, at first gives very little taste, but after a time it leaves an agreeable pungency in the mouth. When kindled it burns with copious flame and smoke (like all the other resins), but this is accompanied with a very pungent fragrant vapour which excites coughing, and is owing to the volatilization of the benzoic acid, that this balsam contains in some abundance, though in much less proportion than the gum-benzoin. When this balsam is boiled with water it melts, and settles at the bottom of the vessel, and appears to remain there unaltered; but the water, without losing its transparency, becomes highly fragrant and pungent, and contains a notable quantity of benzoic acid. This acid may be procured from it by the same methods by which it is extracted from the gum benzoin.

Balsam of Tolu is totally soluble in alcohol, and it is entirely separated from this menstruum (the benzoic acid excepted) by water. If the solution is not concentrated, this precipitated balsam remains for a time suspended in the liquor, and gives it a milky appearance.

By distillation this balsam yields an essential oil and benzoic acid. A hundred grains of the balsam charred by sulphuric acid gave 54 grains of charcoal.

6. Liquidambar, or liquid storax. This is a resinous juice which flows from the trunk of the liquidambar styraciflua, a tree resembling the maple, found in Virginia and Mexico. This balsam is of the consistence of honey, reddish brown, nearly transparent, of an acrid unctuous taste, and a fragrant smell. It is seldom seen, and has not been much examined.

Solid resins.—7. Gum anime. This resin, which is very rarely met with, exsudes from the trunk of the hymenæa courbaril, a large tree growing in Brazil and New Spain. It is brought over either in small roundish tears, or in large masses with the surface covered with a white powder. The colour is yellowish white and pellucid, it is very brittle, and gives a shining fracture. It resembles copal in appearance, but is readily distinguishable from it (among other things) by being easily and totally soluble in alcohol, which copal is not, without much difficulty and particular management. This resin has very little taste. It is soluble in water, but forms a grateful yellow tincture with alcohol, which has a bitterish pungent taste. Distilled with water it gives a very small quantity of essential oil. The natives of the countries whence it is procured chew it, but it is never used in Europe.

8. Benzoin. This resin, which contains more of the benzoic acid than any other substance, has already been described under this article.

9. Dragon's blood. The origin of this valuable resin is not precisely known: it appears to be obtained from several large trees growing in many parts of the East Indies and the Indian Archipelago, of which the most known are the calamus rotang and pterocarpus draco. This resin is very largely mixed and adulterated, so that the samples to be found in the different shops often have scarcely any other resemblance than in colour. The best dragon's blood is found in irregular roundish pieces about the size of a walnut, often wrapped in palm leaves, and of a deep uniform dull red colour, without smell or taste. When broken, its texture appears homogeneous, but evidently cellular. If a little of it is rubbed much in a mortar the colour brightens, and somewhat approaches that of vermilion. Pure dragon's blood is entirely insoluble in water, but totally soluble in alcohol, forming a tincture of a fine blood-red colour. It burns with a bright flame, and readily consumes, leaving only a small portion of a white ash. When charred with sulphuric acid 100 grains leave 48 grains of coal. Dragon's blood is soluble in the essential oils, and also in the fixed, giving them a fine red colour. This resin is largely used in VARNISHING (which see), in lacquering and painting where a full-bodied red is wanted.

10. Gum elemi. This resin comes over from South America in semi-pellucid yellow masses generally wrapped up in leaves, and visibly contaminated with bits of twigs and bark, friable in the fingers, softening by heat, of a fragrant smell and bitterish taste. The tree that yields it is supposed to be the amyris elemifera. Water dissolves only about $\frac{1}{16}$ of this resin, the remainder is soluble in alcohol.

11. Gum hederæ is a resin which exsudes in hot countries from the stalks and leaves of ivy, (hedera helix). It appears in hard compact masses, reddish brown externally, internally of a bright yellow nearly opake, brittle, and with a vitreous fracture. The smell is agreeable when rubbed, the taste slightly astringent. It is not entirely soluble either in water or alcohol, so that in strictness it hardly ought to be called a true

resin. It is little known, and has not been carefully examined.

12. Labdanum, or ladanum. This resin exsudes spontaneously from the leaves and branches of a fragrant shrub (citus creticus), which grows abundantly in the dry mountainous regions of the isle of Candia, Syria, and other parts of the Levant. Ladanum is a black, hard, heavy, resinous mass, rough externally, and in fragments, and its fracture shows distinct sparkling particles. When chewed it gives a gritty feel to the mouth, and a bitterish taste, but does not dissolve. The smell is fragrant. When distilled with water it imparts its grateful smell, but does not sensibly dissolve therein. By distillation it gives a fragrant essential oil, and a tasteless brittle resin remains. Alcohol dissolves all the resin, and always shows in the undissolved residue a considerable quantity of sand and other impurities.

13. Mastich. This very valuable resin is procured from the pistacia lentiscus, a tree that grows to ten or twelve feet high, and is cultivated in many parts of the Levant, particularly in the island of Chio. The best mastich is in the form of small roundish tears, hard and brittle, of a faint yellow colour, nearly transparent, with a light but pleasant smell, and little or no taste. When chewed it softens in the mouth, and excites a considerable flow of saliva. It is nearly insoluble in water, but gives a pleasant flavour when boiled with it. Alcohol and the essential oils dissolve mastich entirely, forming a clear light-yellow tenacious solution, which, either alone or with other resins, is much employed in varnish and other arts. When charred with sulphuric acid, 100 grains afford 66 of charcoal.

14. Sandarac.—This resin exsudes from the bark of several kinds of juniper, and concretes in nearly pellucid yellowish tears, of a pleasant smell and scarcely any taste. It is completely soluble in alcohol, and in oils fixed or essential, and is much used in varnishing.

15. Tacamahacca.—This resin is obtained from the fagara octandra, a tree found in many parts of South America. There are two sorts of this resin; the best is collected in gourd shells, and is unctuous and soft, of a greenish-yellow colour, a delightful smell, approaching to that of lavender, and a bitterish aromatic taste. It is seldom used.

16. Styrax, or storax, is a very fragrant resin procured from the styrax officinalis, a middling-sized tree, a native of Asia. There are two sorts of this resin; the styrax calamita, composed of reddish-brown masses of a waxy consistence, and free from visible impurities. The other, which is by much the commonest sort, is so largely adulterated with saw-dust, that it looks rather like a mass of saw-dust somewhat agglutinated by means of a soft clammy resin. Common styrax infused in water gives it a golden colour, a fragrant smell, and a slight balsamic taste, and contains benzoic acid, which may be extracted in the way mentioned under this article. When styrax is distilled *per se*, it yields along with an empyreumatic oil some crystallized flowers of benzoin. Alcohol dissolves all the true styrax from the impure mass. In flavour, and, when pure, in other properties, this resin strongly resembles the balsam of Tolu.

Gum resins.—These substances, as already mentioned under this article, are not entirely soluble in either water or pure alcohol singly, but completely in a mixture of the two. Many of them have very strong sensible properties, and they are altogether much more active when used medicinally than the resins. When rubbed with water, they form a thick emulsion, from which most of the resinous part separates by repose. The gum resins are principally, though not entirely, used in medicine.

17. Asafœtida. This gum resin is the dried juice of a large umbelliferous plant (ferula asafœtida) which grows in the mountains of Persia and Arabia. It is collected by cutting the mature plant a little above the ground, which causes a quantity of white juice to exsude on the cut surface of the stalk that soon concretes into a brownish soft gum. This removed, a fresh surface is made on the stalks by cutting it down an inch or two, and more of the juice is collected, till after a time the whole is exhausted, and the stalk dies. Asafœtida is brought to us in irregular masses mostly of a brownish colour approaching to red, and involving smaller lumps that are nearly white. It has a very strong fetid smell like garlic, extremely permanent and diffusive; its taste is nauseous and bitterish. If rubbed with water it entirely resolves into a milky emulsion, from which, after standing for some time, most of the resinous part subsides, leaving a clear supernatant liquor containing much gum in solution. Pure alcohol dissolves only the resinous part, and makes a clear yellow solution. Diluted alcohol dissolves the entire resin, and forms a brownish rather turbid tincture. Water distilled off assafœtida rises strongly impregnated with its peculiar smell. A hundred grains, charred by sulphuric acid, yield 58 grains of charcoal.

18. Galbanum is the concrete gummy-resinous juice of an umbelliferous plant of Ethiopia (bubon galbanum), and is brought over in pale, semi-transparent, soft, tenacious masses, intermixed with clear white tears of the same resin. This juice has a strong, unpleasant smell, and a bitterish, warm taste. When rubbed with water it dissolves into a milky emulsion, and has all other chemical properties of the gum resins.

19. Gum ammoniacum. A gum-resin brought from the East Indies, composed of small white lumps or tears, more brittle than most of the other gum-resins, and easily reduced to fine powder in cold weather. It unites perfectly with water into a milky emulsion, and water and alcohol separately dissolves only a portion of the gum. It is sometimes employed in a small degree in the composition of cements and varnishes. A hundred grains, charred by sulphuric acid, give 58 of charcoal.

20. Opoponax is a strong-smelling gummy resinous juice procured from the pastinaca opoponax, and brought from Turkey and the East Indies in small round drops or irregular lumps of a reddish yellow colour. It mingles perfectly with water, and agrees in chemical properties with the other gum-resins.

21. Gum sagapenum is a fetid gum much resembling asafœtida, but weaker in sensible properties; it is brought from Alexandria in soft irregular masses, sticking to the fingers when handled. In chemical properties it agrees very closely with asafœtida.

22. Olibanum. A gum-resin brought from Turkey and the East Indies in large roundish lumps, semi-pellucid, and when of the purest kind, of a slight yellow colour. When chewed it has a bitterish pungent taste, and makes the saliva milky. The smell is moderately strong, and not disagreeable. When laid on hot iron it burns with

a strong, penetrating, and rather fragrant smell, and is supposed to have been used by the ancients for incense.

23. Gamboge. For a description of this valuable gum, see the article GAMBOGE.

24. Euphorbium is a juice procured from a plant of this name, brought chiefly from Barbary, in drops of an irregular form, of a pale yellow and brittle. This gum-resin has but little smell, but the taste is one of the most biting and acrid of any known substance, and the effect on the organs remains for a considerable time. It consists of about equal parts of gum and resin.

25. Myrrh. This gum-resin exsudes from a tree which grows in Abyssinia and many parts of Arabia, but is little known. It comes over in rounded pieces of various size, and still more varying in colour, consistence, taste, and smell. The best sort is semi-transparent, friable, unctuous to the touch, of an uniform light or reddish-yellow colour, of a strong but not ungrateful smell, and a slightly pungent and very bitter taste. It burns with some difficulty. It completely dissolves in boiling water, when previously pulverized; but on cooling, a yellow resinous sediment falls down. The supernatant liquor evaporated nearly to dryness yields a saponaceous extract, which retains much of the flavour of the myrrh. Alcohol digested with myrrh forms a very strong smelling, intensely bitter tincture, of a very fine golden yellow colour, which is made turbid by the addition of water.

Guaiacum. This substance has usually been reckoned among the perfect resins, but late experiments, though they are not complete, show that it has some very peculiar properties, so that it cannot be classed properly either with the gums or resins. This gum is procured from the guaiacum wood or lignum vita, which is a very hard ponderous wood, obviously abounding with resin, and as if it were soaked in it, so that it has a peculiar greasy feel, and a very strong and peculiar smell when rubbed. Gum guaiacum is brought over in irregular masses, easily friable, of a dusky green colour. It is in some degree transparent, and it breaks with a vitreous fracture. When pulverized, it is of a grey colour, but becomes green by exposure to air. It melts when heated, and gives a very pungent aromatic odour. The smell is fragrant; it gives scarcely any taste in the mouth, but when swallowed it excites a strong burning sensation in the throat. Mr. Hatchett has observed that guaiacum, though apparently a pure resin, differs from all the pure resins, in giving much oxalic acid by the nitric, and in yielding scarcely any artificial tannin with the nitric acid. Mr. Brande has since given an interesting analysis of this substance.

RE'SINOUS. *a.* (*resineaux*, French.) Containing resin; consisting of resin (*Boyle*).

RESINOUS ELECTRICITY, is that kind of electricity which is produced by exciting bodies of the resinous kind, and which is generally negative. See ELECTRICITY.

RE'SINOUSNESS. *s.* (from *resinous.*) The quality of being resinous.

RESIPI'SCENCE. *s.* (*resipiscence*, Fr.) Wisdom after the fact; repentance.

To RESI'ST. *v. a.* (*resisto*, Latin.) 1. To oppose; to act against (*Shakspeare*). 2. To not admit impression or force (*Milton*).

To RESI'ST. *v. n.* To make opposition.

RESI'STANCE. *s.* (*resistance*, French.) 1. The act of resisting; opposition (*Macca.*).

2. The quality of not yielding to force, or external impression (*Bacon*).

RESISTANCE, or RESISTING FORCE, in physics, any power which acts in opposition to another, so as to destroy or diminish its effect.

There are various kinds of resistance, arising from the various natures and properties of the resisting bodies, and governed by various laws: as the resistance of solids, the resistance of fluids, the resistance of the air, &c. Of each of these in their order.

RESISTANCE OF SOLIDS, in mechanics, is the force with which the quiescent parts of solid bodies oppose the motion of others contiguous to them.

Of these, there are two kinds. The first where the resisting and the resisted parts, i. e. the moving and quiescent bodies, are only contiguous, and do not cohere; constituting separate bodies or masses. This resistance is what Leibnitz calls resistance of the surface, but which is more properly called friction: for the laws of which, see the article FRICTION.

The second case of resistance, is where the resisting and resisted parts are not only contiguous, but cohere, being parts of the same continued body or mass. This resistance was first considered by Galileo, and may properly be called renitency.

As to what regards the resistance of bodies when struck by others in motion, see PERCUSSION and COLLISION. And for the resistance of solids to fracture, see STRENGTH and STRESS.

RESISTANCE OF FLUIDS, is the force with which bodies, moving in fluid mediums, are impeded and retarded in their motion.

A body moving in a fluid is resisted from two causes. The first of these is the cohesion of the parts of the fluid. For a body, in its motion, separating the parts of a fluid, must overcome the force with which those parts cohere. The second is the inertia, or inactivity of matter, by which a certain force is required to move the particles from their places, in order to let the body pass.

The retardation from the first cause is always the same in the same space, whatever the velocity be, the body remaining the same: that is, the resistance is as the space run through in the same time: but the velocity is also in the same ratio of the space run over in the same time; and therefore the resistance, from this cause, is as the velocity itelf.

The resistance from the second cause, when a body moves through the same fluid with different velocities, is as the square of the velocity. For, first the resistance increases according to the number of particles or quantity of the fluid struck in the same time; which number must be as the space run through in that time, that is, as the velocity: but the resistance also increases in proportion to the force with which the body strikes against every part; which force is also as the velocity of the body, so as to be double with a double velocity, and triple with a triple one, &c.; therefore, on both these accounts, the resistance is as the velocity multiplied by the velocity, or as the square of the velocity. Upon the whole therefore, on account of both causes, viz. the tenacity and inertia of the fluid, the body is resisted partly as the velocity and partly as the square of the velocity.

But when the same body moves through different fluids with the same velocity, the resistance from

the second cause follows the proportion of the matter to be removed in the same time, which is as the density of the fluid.

Hence therefore, if d denote the density of the fluid,

v the velocity of the body,

and a and b constant coefficients:

then $adv^2 + bv$ will be proportional to the whole resistance to the same body, moving with different velocities, in the same direction, through fluids of different densities, but of the same tenacity.

But, to take in the consideration of different tenacities of fluids; if t denote the tenacity, or the cohesion of the parts of the fluid, then $adv^2 + btv$ will be as the said whole resistance.

Indeed the quantity of resistance from the cohesion of the parts of fluids, except in glutinous ones, is very small in respect of the other resistance; and it also increases in a much lower degree, being only as the velocity, while the other increases as the square of the velocity, and rather more. Hence then the term btv is very small in respect of the other term adv^2; and consequently the resistance is nearly as this latter term; or nearly as the square of the velocity. Which rule has been employed by most authors, and is very near the truth in slow motions; but in very rapid ones, it differs considerably from the truth, as we shall perceive below; not indeed from the omission of the small term ctv, due to the cohesion, but from the want of the full counter pressure on the hinder part of the body, a vacuum, either perfect or partial, being left behind the body in its motion; and also perhaps to some compression or accumulation of the fluid against the fore part of the body. Hence,

To conceive the resistance of fluids to a body moving in them, we must distinguish between those fluids which, being greatly compressed by some incumbent weight, always close up the space behind the body in motion, without leaving any vacuity there; and those fluids which, not being much compressed, do not quickly fill up the space quitted by the body in motion, but leave a kind of vacuum behind it. These differences, in the resisting fluids, will occasion very remarkable varieties in the laws of their resistance, and are absolutely necessary to be considered in the determination of the action of the air on shot and shells; for the air partakes of both these affections, according to the different velocities of the projected body.

In treating of these resistances too, the fluids may be considered either as continued or discontinued, that is, having their particles contiguous or else as separated and unconnected; and also either as elastic or non-elastic. If a fluid were so constituted, that all the particles composing it were at some distance from each other, and having no action between them, then the resistance of a body moving in it would be easily computed, from the quantity of motion communicated to those particles; for instance, if a cylinder moved in such a fluid in the direction of its axis, it would communicate to the particles it met with a velocity equal to its own, and in its own direction, when neither the cylinder nor the parts of the fluid are elastic: whence, if the velocity and diameter of the cylinder be known, and also the density of the fluid, there would thence be determined the quantity of motion communicated to the fluid, which (as action and reaction are equal) is the same with the quantity lost by the cylinder, and consequently the resistance would thus be ascertained.

In this kind of discontinued fluid, the particles being detached from each other, every one of them can pursue its own motion in any direction, at least for some time, independent of the neighbouring ones; so that, instead of a cylinder moving in the direction of its axis, if a body with a surface oblique to its direction be supposed to move in such a fluid, the motion which the parts of the fluid will hence acquire, will not be in the direction of the resisted body, but perpendicular to its oblique surface; whence the resistance to such a body will not be estimated from the whole motion communicated to the particles of the fluid, but from that part of it only which is in the direction of the resisted body. In fluids then, where the parts are thus discontinued from each other, the different obliquities of that surface which goes foremost, will occasion considerable changes in the resistance; although the transverse section of the solid should in all cases be the same: and Newton has particularly determined that, in a fluid thus constituted, the resistance of a globe is but half the resistance of a cylinder of the same diameter, moving, in the direction of its axis, with the same velocity.

But though the hypothesis of a fluid thus constituted be of great use in explaining the nature of resistances, yet we know of no such fluid existing in nature; all the fluids with which we are conversant being so formed, that their particles either lie contiguous to each other, or at least act on each other in the same manner as if they did: consequently, in these fluids, no one particle that is contiguous to the resisted body can be moved, without moving at the same time a great number of others, some of which will be distant from it; and the motion thus communicated to a mass of the fluid will not be in any one determined direction, but different in all the particles, according to the different positions in which they lie in contact with those from which they receive their impulse; whence, great numbers of the particles being diverted into oblique directions, the resistance of the moving body, which will depend on the quantity of motion communicated to the fluid in its own direction, will be different in quantity from what it would be in the foregoing supposition, and its estimation becomes much more complicated and operose.

If the fluid be compressed by the incumbent weight of its upper parts (as all fluids are with us, except at their very surface), and if the velocity of the moving body be much less than that with which the parts of the fluid would rush into a void space, in consequence of their compression; it is evident, that in this case the space left by the moving body will be instantaneously filled up by the fluid; and the parts of the fluid against which the foremost part of the body presses in its motion, will, instead of being impelled forwards in the direction of the body, in some measure circulate towards the hinder part of the body, in order to restore the equilibrium, which the constant influx of the fluid behind the body would otherwise destroy; whence the progressive motion of the fluid, and consequently the resistance of the body, which depends upon it, would in this instance be much less, than in the hypothesis where each particle is supposed to acquire, from the stroke of the resisting body, a velocity equal to that with which the body moved, and in the same direction. Newton has

determined, that the resistance of a cylinder moving in the direction of its axis, in such a compressed fluid as we have here treated of, is but one-fourth part of the resistance to the same cylinder, if it moved with the same velocity in a fluid constituted in the manner described in the first hypothesis, each fluid being supposed of the same density.

But again, it is not only in the quantity of their resistance that these fluids differ, but also in the different manner in which they act upon solids of different forms moving in them. In the discontinued fluid, first described, the obliquity of the foremost surface of the moving body would diminish the resistance; but the same thing does not hold true in compressed fluids, at least not in any considerable degree; for the chief resistance in compressed fluids arises from the greater or less facility with which the fluid, impelled by the fore part of the body, can circulate towards its hinder part; and this being little, if at all, affected by the form of the moving body, whether it be cylindrical, conical, or spherical, it follows, that while the transverse section of the body is the same, and consequently the quantity of impelled fluid also, the change of figure in the body will scarcely affect the quantity of its resistance.

And this case, viz. the resistance of a compressed fluid to a solid, moving in it with a velocity much less than what the parts of the fluid would acquire from their compression, has been very fully considered by Newton, who has ascertained the quantity of such a resistance, to the different magnitudes of the moving body, and the density of the fluid. But he expressly informs us that the rules he has laid down are not generally true, but only upon a supposition that the compression of the fluid be increased in the greater velocities of the moving body: however, some unskilful writers, who have followed him, overlooking this caution, have applied his determination to bodies moving with all sorts of velocities, without attending to the different compressions of the fluids they are resisted by; and by this means they have accounted the resistance, for instance, of the air to musket and cannon shot, to be but one-third part of what it is found to be by experience.

It is indeed evident that the resisting power of the medium must be increased, when the resisted body moves so fast that the fluid cannot instantaneously press in behind it, and fill the deserted space; for when this happens, the body will be deprived of the pressure of the fluid behind it; which in some measure balanced its resistance, or at least the fore pressure, and must support on its fore part the whole weight of a column of the fluid, over and above the motion it gives to the parts of the same; and besides, the motion in the particles driven before the body, is less affected in this case by the compression of the fluid, and consequently they are less deflected from the direction in which they are impelled by the resisted surface; whence it happens that this species of resistance approaches more and more to that described in the first hypothesis, where each particle of the fluid being unconnected with the neighbouring ones, pursued its own motion, in its own direction, without being interrupted or deflected by their contiguity; and therefore, as the resistance of a discontinued fluid to a cylinder, moving in the direction of its axis, is four times greater than the resistance of a fluid sufficiently compressed of the same density, it follows that the resistance of a fluid, when a vacuity is left behind the moving body, may be near four times greater than that of the same fluid, when no such vacuity is formed; for when a void space is thus left, the resistance approaches in its nature to that of a discontinued fluid.

This then may probably be the case in a cylinder moving in the same compressed fluid, according to the different degrees of its velocity; so that if it set out with a great velocity, and moves in the fluid till that velocity be much diminished, the resisting power of the medium may be near four times greater in the beginning of its motion than in the end.

In a globe, the difference will not be so great, because, on account of its oblique surface, its resistance in a discontinued medium is but about twice as much as in one properly compressed; for its oblique surface diminishes its resistance in one case, and not in the other: however, as the compression of the medium, even when a vacuity is left behind the moving body, may yet confine the oblique motion of the parts of the fluid, which are driven before the body, and as in an elastic fluid, such as our air is, there will be some degree of condensation in those parts; it is highly probable that the resistance of a globe, moving in a compressed fluid with a great velocity, may greatly exceed the proportion of the resistance to slow motions.

And as this increase of the resisting power of the medium will take place, when the velocity of the moving body is so great, that a perfect vacuum is left behind it, so some degree of augmentation will be sensible in velocities much short of this; for even when, by the compression of the fluid, the space left behind the body is instantaneously filled up; yet, if the velocity with which the parts of the fluid rush in behind, is not much greater than that with which the body moves, the same reasons that have been urged above, in the case of an absolute vacuity, will hold in a less degree in this instance: and therefore it is not to be supposed that, in the increased resistance which has been hitherto treated of, it immediately vanishes when the compression of the fluid is just sufficient to prevent a vacuum behind the resisted body; but we must consider it as diminishing only according as the velocity, with which the parts of the fluid follow the body, exceeds that with which the body moves.

Hence then it may be concluded, that if a globe sets out in a resisting medium, with a velocity much exceeding that with which the particles of the medium would rush into a void space, in consequence of their compression, so that a vacuum is necessarily left behind the globe in its motion; the resistance of this medium to the globe will be much greater, in proportion to its velocity, than what we are sure, from Sir I. Newton, would take place in a slower motion. We may farther conclude, that the resisting power of the medium will gradually diminish as the velocity of the globe decreases, till at last, when it moves with velocities which bear but a small proportion to that with which the particles of the medium follow it, the resistance becomes the same with what is assigned by Newton in the case of a compressed fluid.

And from this determination may be seen, how false that position is, which asserts the resistance of any medium to be always in the duplicate ratio of the velocity of the resisted body; for it plainly

appears, by what has been said, that this can only be considered as nearly true in small variations of velocity, and can never be applied in comparing together the resistances to all velocities whatever, without incurring the most enormous errors. See Robins's Gunnery, chap. 2. prop. 1. and Hutton's Select Exercises, pa. 235, &c. See also the articles RESISTANCE OF THE AIR, PROJECTILE, and GUNNERY.

Resistance and retardation are used indifferently for each other, as being both in the same proportion, and the same resistance always generating the same retardation. But with regard to different bodies, the same resistance frequently generates different retardations; the resistance being as the quantity of motion, and the retardation that of the celerity. For the difference and measure of the two, see RETARDATION.

The retardations from this resistance may be compared together, by comparing the resistance with the gravity or quantity of matter. It is demonstrated that the resistance of a cylinder, which moves in the direction of its axis, is equal to the weight of a column of the fluid, whose base is equal to that of the cylinder, and its altitude equal to the height through which a body must fall in vacuo, by the force of gravity, to acquire the velocity of the moving body. So that, if a denote the area of the face or end of the cylinder, or other prism, v its velocity, and n the specific gravity of the fluid; then, the altitude due to the velocity v being $\frac{v^2}{4g}$, the whole resistance, or motive force m, will be $a \times n \times \frac{v^2}{4g} = \frac{anv^2}{4g}$; the quantity g being $= 16\frac{1}{12}$ feet, or the space a body falls, in vacuo, in the first second of time. And the resistance to a globe of the same diameter would be the half of this. Let a ball, for instance, of 3 inches diameter, be moved in water with a celerity of 16 feet per second of time: now from experiments on pendulums, and on falling bodies, it has been found, that this is the celerity which a body acquires in falling from the height of 4 feet; therefore the weight of a cylinder of water of 3 inches diameter, and 4 feet high, that is a weight of about 12lb. 4oz. is equal to the resistance of a cylinder; and consequently the half of it, or 6lb. 2oz. is that of the ball. Or, the formula $\frac{anv^2}{4g}$ gives $\frac{\cdot 7854 \times 9 \times 1000 \times 16 \times 16}{144 \times 4 \times 16} = 196$ oz. or 12lb. 4oz. for the resistance of the cylinder, or 6lb. 2oz. for that of the ball, the same as before.

Let now the resistance, so discovered, be divided by the weight of the body, and the quotient will show the ratio of the retardation to the force of gravity. So if the said ball, of 3 inches diameter, be of cast iron, it will weigh nearly 61 ounces, or $3\frac{13}{16}$lb; and the resistance being 6lb. 2oz. or 98 ounces; therefore, the resistance being to the gravity as 98 to 61, the retardation, or retarding force, will be $\frac{98}{61}$ or $1\frac{3}{5}$, the force of gravity being 1. Or thus; because a the area of a great circle of the ball, is $+ pd^2$, where d is the diameter, and $p = \cdot 7854$, therefore the resistance to the ball is $m = \frac{pud^2v^2}{8g}$; and because its solid content is $= \frac{2}{3}pd^3$, and its weight $\frac{2}{3}$ N pd^3, where N denotes its specific gravity; therefore, dividing the resistance or motive force m by the weight w, gives $\frac{m}{w} = \frac{3nv^2}{16\,\mathrm{N}\,dg} = f$ the retardation, or retarding force, that of gravity being 1; which is therefore as the square of the velocity directly, and as the diameter inversely; and this is the reason why a large ball overcomes the resistance better than a small one, of the same density.

The resistance of bodies of different figures, moving in one and the same medium, has been considered by Mr. J. Bernouli, and the rules he lays down on this subject are the following: 1. If an isosceles triangle be moved in the fluid according to the direction of a line which is normal to its base; first with the vertex foremost, and then with its base; the resistances will be as the legs, and as the square of the base, and as the sum of the legs. 2. The resistance of a square moved according to the direction of its side, and of its diagonal, is as the diagonal to the side. 3. The resistance of a circular segment (less than a semicircle) carried in a direction perpendicular to its basis, when it goes with the base foremost, and when with its vertex foremost (the same direction and celerity continuing, which is all along supposed) is as the square of the diameter to the same, less one-third of the square of the base of the segment. Hence the resistances of a semicircle, when its base, and when its vertex go foremost, are to one another in a sesquialterate ratio. 4. A parabola moving in the direction of its axis, with its basis, and then its vertex foremost, has its resistances, as the tangent to an arch of a circle, whose diameter is equal to the parameter, and the tangent equal to half the basis of the parabola. 5. The resistances of an hyperbola, or the semi-ellipsis, when the base and when the vertex go foremost, may be thus computed; let it be, as the sum, or difference, of the transverse axis and latus rectum is to the transverse axis, so is the square of the latus rectum to the square of the diameter of a certain circle; in which circle apply a tangent equal to half the basis of the hyperbola or ellipsis. Then say again, as the sum, or difference, of the axis and parameter is to the parameter, so is the aforesaid tangent to another right line. And further, as the sum, or difference, of the axis and parameter is to the axis, so is the circular arch corresponding to the aforesaid tangent, to another arch. This done, the resistance will be as the tangent to the sum, or difference, of the right line thus found, and that arch last mentioned. 6. In general, the resistances of any figure whatsoever going now with its base foremost, and then with its vertex, are as the figure of the basis to the sum of all the cubes of the element of the basis divided by the squares of the element of the curve line. All which rules, he thinks, may be of use in the fabric or construction of ships, and in perfecting the art of navigation universally. As also for determining the figures of the balls of pendulums for clocks.

RESISTANCE OF THE AIR, is the force with which the motion of bodies, particularly of projectiles, is retarded by the opposition of the air or atmosphere. See GUNNERY, PROJECTILES, &c.

The air being a fluid, the general laws of the resistance of fluids obtain in it; subject only to some variations and irregularities from the different degrees of density in the different stations or regions of the atmosphere.

The resistance of the air is chiefly of use in military projectiles, in order to allow for the differences caused in their flight and range by it. Before the time of Mr. Robins, it was thought that this resistance to the motion of such heavy bodies as iron balls and shells, was too inconsiderable to be regarded; and that the rules

and conclusions derived from the common parabolic theory, were sufficiently exact for the common practice of gunnery. But that gentleman showed, in his New Principles of Gunnery, that, so far from being inconsiderable, it is in reality enormously great, and by no means to be rejected without incurring the grossest errors; so much so, that balls or shells which range, at the most, in the air, to the distance of two or three miles, would in a vacuum range to 20 or 30 miles, or more. To determine the quantity of this resistance, in the case of different velocities, Mr. Robins discharged musket-balls, with various degrees of known velocity, against his balistic pendulums, placed at several different distances, and so discovered by experiment the quantity of velocity lost, when passing through those distances, or spaces of air, with the several known degrees of celerity. For having thus known the velocity lost or destroyed, in passing over a certain space, in a certain time, (which time is very nearly equal to the quotient of the space divided by the medium velocity between the greatest and least, or between the velocity at the mouth of the gun and that at the pendulum); that is, knowing the velocity v, the space s, and time t; the resisting force is thence easily known, being equal to $\frac{vb}{2gt}$ or $\frac{vvb}{2gs}$, where b denotes the weight of the ball, and V the medium velocity above-mentioned. The balls employed upon this occasion by Mr. Robins were leaden ones, of $\frac{1}{12}$ of a pound weight, and $\frac{3}{4}$ of an inch diameter; and to the medium velocity of

1600 feet, the resistance was 11 lb.
1065 feet, ... $2\frac{4}{5}$;

but by the theory of Newton, before laid down, the former of these should be only $4\frac{3}{4}$ lb. and the latter 1 lb.; so that, in the former case the real resistance is more than double of that by the theory, being increased as 9 to 22; and in the lesser velocity the increase is from 2 to $2\frac{4}{5}$, or as 5 to 7 only.

Mr. Euler has shewn, that the common doctrine of resistance answers pretty well when the motion is not very swift, but in swift motions it gives the resistance less than it ought to be, on two accounts: 1. Because in quick motions, the air does not fill up the space behind the body fast enough to press on the hinder parts, to counterbalance the weight of the atmosphere on the fore part. 2. The density of the air before the ball being increased by the quick motion, will press more strongly on the fore part, and so will resist more than lighter air in its natural state. He has shewn that Mr. Robins has restrained his rule to velocities not exceeding 1670 feet per second; whereas had he extended it to greater velocities, the result must have been erroneous; and he gives another formula himself, and deduces conclusions differing from those of Mr. Robins.

The subject of the resistance of the air, as begun by Robins, has been prosecuted by Dr. Hutton, to a very great extent and variety, both with the whirling-machine, and with cannon balls of all sizes, from 1lb. to 6lb. weight, as well as with figures of many other different shapes, both on the fore part and hind part of them, and with planes set at all varieties of angles of inclination to the path of motion of the same; from all which he has obtained the real resistance to bodies for all velocities, from 1 up to 2000 feet per second; together with the law of the resistance to the same body for all different velocities, and for different sizes with the same velocity, and also for all angles of inclination.

RESISTANCES OF DIFFERENT BODIES.

Velocity per second.	Small hemis.	Large hemisph.		Cone.		Cylinder.	Whole globe.	Resistance as the power of the velocity.
	flat side.	flat side.	round side.	vertex.	base.			
feet.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	
3	·028	·051	·020	·028	·064	·050	·027	
4	·048	·096	·039	·048	·109	·090	·047	
5	·072	·148	·063	·071	·162	·143	·068	
6	·103	·211	·092	·098	·225	·205	·094	
7	·141	·284	·123	·129	·298	·278	·125	
8	·184	·368	·160	·168	·382	·360	·162	
9	·233	·464	·199	·211	·478	·456	·205	
10	·287	·573	·242	·260	·587	·565	·255	
11	·349	·698	·292	·315	·712	·688	·310	2·052
12	·418	·836	·347	·376	·850	·826	·370	2·042
13	·492	·988	·409	·440	1·000	·979	·435	2 036
14	·573	1·154	·478	·512	1·166	1·145	·505	2·031
15	·661	1·336	·552	·589	1 346	1·327	·581	2·031
16	·754	1·538	·634	·673	1·546	1·526	·663	2 033
17	·853	1·757	·722	·762	1·763	1·745	·752	2·038
18	·959	1·998	·818	·858	2·002	1·986	·848	2·044
19	1·073	2·258	·922	·959	2·260	2·246	·949	2·047
20	1·196	2·542	1·033	1·069	2·540	2·528	1·057	2·051
Mean propor. Nos.	140	288	119	126	291	285	124	2·040
1	2	3	4	5	6	7	8	9

In this table are contained the resistances to several forms of bodies, when moved with several degrees of velocity, from three feet per second to twenty. The names of the bodies are at the tops of the columns, as also which end went foremost through the air; the different velocities are in the first column, and the resistances on the same line, in their several columns, in avordupois ounces and decimal parts. So on the first line are contained the resistances when the bodies move with a velocity of three feet in a second, viz. in the second column for the small hemisphere, of $4\frac{3}{4}$ inches diameter, its resistance ·028 ounces when the flat side went foremost; in the third and fourth columns the resistances to a larger hemisphere, first with the flat side, and next the round side foremost; the diameter of this, as well as all the following figures, being $6\frac{3}{8}$ inches, and therefore the area of the great circle $=32$ square inches, or $\frac{2}{9}$ of a square foot; then in the 5th and 6th columns are the resistances to a cone, first its vertex, and then its base foremost, the altitude of the cone being $6\frac{3}{8}$ inches, the same as the diameter of its base; in the seventh column the resistance to the end of the cylinder, and in the eighth, that against the whole globe or sphere. All the numbers shew the real weights which are equal to the resistances; and at the bottoms of the columns are placed proportional numbers, which shew the mean proportions of the resistances of all the figures to one another, with any velocity. Lastly, in the ninth column are placed the exponents of the power of the velocity which the resistances in the eighth column bear to each other, viz. which that of the ten-feet velocity bears to each of the following ones, the medium of all of them being as the 2·04 power of the velocity, that is, very little above the square or second power of the velocity, so far as the velocities in this table extend.

From this table the following inferences are easily deduced:

1. That the resistance is nearly in the same proportion as the surfaces; a small increase only taking place in the greater surfaces, and for the greater velocities. Thus, by comparing together the numbers in the second and third columns, for the bases of the two hemispheres, the areas of which bases are in the proportion of $17\frac{3}{4}$ to 32, or 5 to 9 very nearly, it appears that the numbers in those two columns, expressing the resistances, are nearly as 1 to 2 or 5 to 10, as far as the velocity of 12 feet; but after that, the resistances on the greater surface increase gradually more and more above that proportion.

2. The resistance to the same surface with different velocities is, in these slow motions, nearly as the square of the velocity; but gradually increases more and more above that proportion as the velocity increases. This is manifest from all the columns: and the index of the power of the velocity is set down in the ninth column, for the resistances in the eighth, the medium being 2·04; by which it appears that the resistance to the same body is, in these slow motions, as the 2·04 power of the velocity, or nearly as the square of it.

3. The round ends, and sharp ends, of solids, suffer less resistance than the flat or plane ends, of the same diameter; but the sharper end has not always the less resistance. Thus, the cylinder, and the flat ends of the hemisphere and cone, have more resistance than the round or sharp ends of the same; but the round side of the hemisphere has less resistance than the sharper end of the cone.

4. The resistance on the base of the hemisphere is to that on the round, or whole sphere, as $2\frac{1}{3}$ to 1, instead of 2 to 1, as the theory gives that relation. Also the experimented resistance, on each of these, is nearly $\frac{1}{4}$ more than the quantity assigned by the theory.

5. The resistance on the base of the cone, is to that on the vertex, nearly as $2\frac{1}{10}$ to 1; and in the same ratio is radius to the sine of the angle of inclination of the side of the cone to its path or axis. So that, in this instance, the resistance is directly as the sine of the angle of incidence, the transverse section being the same.

6. When the hinder parts of bodies are of different forms, the resistances are different, though the foreparts are exactly alike and equal; owing probably to the different pressures of the air on the hinder parts. Thus, the resistance to the forepart of the cylinder, is less than on the equal flat surface of the cone, or of the hemisphere; because the hinder part of the cylinder is more pressed or pushed by the following air than those of the other two figures; also, for the same reason, the base of the hemisphere suffers a less resistance than that of the cone, and the round side of the hemisphere less than the whole sphere.

For more on the subject of this article, see Newton's Principia; Gregory's Mechanics, vol. 1; Repertory of Arts and Manufactures, vol. 4, second series, p. 121; Playfair's Outlines of Natural Philosophy; Hutton's Course, vols. 2 and 3; and our articles GUNNERY and PROJECTILE.

RESISTIBI'LITY. *s.* (from *resistible.*) 1. Quality of resisting. 2. Quality of being resistible (*Hammond*).

RESI'STIBLE. *s.* (from *resist.*) That may be resisted (*Hale*).

RESI'STLESS. *a.* (from *resist.*) Irresistible; that cannot be opposed (*Raleigh*).

RESO'LVABLE. *a.* (from *resolve.*) 1. That may be referred or reduced (*South*). 2. Dissoluble; admitting separation of parts (*Arbuth.*). 3. Capable of solution, or of being made less obscure (*Brown*).

RESO'LUBLE. *a.* (*resoluble*, French.) That may be melted or dissolved.

To RESO'LVE. *v. a.* (*resolvo*, Latin.) 1. To inform; to free from a doubt or difficulty (*Shakspeare*). 2. To solve; to clear (*Rogers*). 3. To settle in an opinion (*Shakspeare*). 4. To fix in a determination (*Dryden*). 5. To fix in constancy; to confirm (*Shakspeare*). 6. To melt; to dissolve (*Arbuthnot*). 7. To analyze; to reduce (*Tillotson*).

To RESO'LVE. *v. n.* 1. To determine; to decree with one's self (*Milton*). 2. To melt; to be dissolved (*South*). 3. To be settled in opinion (*Locke*).

RESO'LVE. *s.* (from the verb.) Resolution; fixed determination (*Denham*).

RESO'LVEDLY. *ad.* (from *resolved.*) With firmness and constancy (*Grew*).

RESO'LVEDNESS. *s.* (from *resolved.*) Resolution; constancy; firmness (*D. of Piety*).

RESO'LVENT. *s.* (*resolvens*, Latin.) That has the power of causing solution (*Wiseman*).

RESOLVENTS. (*medicamenta resolventia*, from *resolvo*, to loosen.) A term applied by

surgeons to such substances as discuss inflammatory tumours.

RESO'LVER. *s.* (from *resolve.*) 1. One that forms a firm resolution (*Hammond*). 2. One that dissolves; one that separates parts (*Boyle*).

RE'SOLUTE. *a.* (*resolu*, French.) Determined; fixed; constant; steady; firm (*Shakspeare*).

RE'SOLUTELY. *ad.* Determinately; firmly; constantly; steadily (*Roscommon*).

RE'SOLUTENESS. *s.* Determinateness; state of being fixed in resolution (*Boyle*).

RESOLU'TION. *s.* (*resolutio*, Latin.) 1. Act of clearing difficulties (*Brown*). 2. Analysis; act of separating any thing into constituent parts (*Hale*). 3. Dissolution (*Digby*). 4. (from *resolute.*) Fixed determination; settled thought (*King Charles*). 5. Constancy; firmness; steadiness in good or bad (*Sidney*). 6. Determination of a cause in courts of justice (*Hale*).

RESOLUTION, in music. See MUSIC.

RESOLUTION ISLAND, an island in the Atlantic ocean, 50 miles long and 20 broad, on the N. side of the entrance into Hudson strait. Lon. 65. 0 W. Lat. 61. 40 N.

RESOLUTION ISLE, a small island in the Pacific ocean, 160 leagues E. of Otaheite, so called from the ship in which Cook made his second voyage. Lon. 141. 15 W. Lat. 17. 23 S.

RE'SOLUTIVE. *a.* (*resolutus*, Lat. *resolutif*, French.) Having the power to dissolve or relax.

RE'SONANCE. *s.* (from *resono*, Latin.) Sound; resound (*Boyle*).

RE'SONANT. *a.* (*resonans*, Lat.) Resounding (*Milton*).

To RESO'RT. *v. n.* (*ressortir*, French.) 1. To have recourse (*Clarendon*). 2. To go publicly (*Milton*). 3. To repair to (*Pope*). 4. To fall back. In law (*Hale*).

RESO'RT. *s.* (from the verb.) 1. Frequency; assembly; meeting (*Dryden*). 2. Concourse; confluence (*Swift*). 3. Act of visiting (*Shakspeare*). 4. (*ressort*, French.) Movement; active power; spring (*Bacon*).

RESO'RTER. *s.* (from *resort.*) One that frequents, or visits.

To RESOU'ND. *v. a.* (*resono*, Latin.) 1. To echo; to sound back (*Pope*). 2. To celebrate by sound (*Peacham*). 3. To sound; to tell so as to be heard far (*Pope*).

To RESOU'ND. *v. n.* 1. To be echoed back (*South*). 2. To be much and loudly mentioned (*Milton*).

RESOU'RCE. *s.* (*ressourse*, Fr.) Some new or unexpected means that offer; resort; expedient (*Dryden*).

To RESO'W. *v. a.* (*re* and *sow.*) To sow anew (*Bacon*).

RESP, the name of a disorder to which sheep are subject. See ROT.

To RESPEA'K. *v. n.* (*re* and *speak.*) To answer (*Shakspeare*).

To RESPE'CT. *v. a.* (*respectus*, Latin.) 1. To regard; to have regard to (*Bacon*). 2. (*respecter*, Fr.) To consider with a lower degree of reverence (*Sidney*). 3. To have relation to. 4. To look toward (*Brown*).

RESPE'CT. *s.* (*respect*, Fr. *respectus*, Lat.) 1. Regard; attention (*Shakspeare*). 2. Reverence; honour (*Prior*). 3. Awful kindness (*Locke*). 4. Good-will (*Shakspeare*). 5. Partial regard (*Proverbs*). 6. Reverend character (*Shakspeare*). 7. Manner of treating others (*Wotton*). 8. Consideration; motive (*Hooker*). 9. Relation; regard (*Tillotson*).

RESPE'CTABLE. *a.* (*respectable*, Fr.) Venerable; meriting respect.

RESPE'CTER. *s.* (from *respect.*) One that has partial regard (*Swift*).

RESPE'CTFUL. *a.* (*respect* and *full.*) Ceremonious; full of outward civility (*Prior*).

RESPE'CTFULLY. *ad.* With some degree of reverence (*Dryden*).

RESPE'CTFULNESS. *s.* (from *respectful.*) The quality of being respectful.

RESPE'CTIVE. *a.* (from *respect.*) 1. Particular; relating to particular persons or things (*Burnet*). 2. Relative; not absolute (*Rogers*). 3. Worthy of reverence: not in use (*Shaksp.*). 4. Careful; cautious: obsolete (*Hooker*).

RESPE'CTIVELY. *ad.* 1. Particularly; as each belongs to each (*South*). 2. Relatively; not absolutely (*Raleigh*). 3. Partially; with respect to private views: obsolete (*Hooker*). 4. With great reverence: not used (*Shakspeare*).

RESPE'RSION. *s.* (*respersio*, Lat.) The act of sprinkling.

RESPIRA'TION. *s.* (*respiratio*, Fr.) 1. The act of breathing (*Bacon*). 2. Relief from toil (*Milton*).

RESPIRATION, in physiology, a function equally necessary to animals and vegetables, by which a something is separated and introduced into the system from the surrounding atmosphere, and thrown forth into the surrounding atmosphere, from the respiratory organ. This organ, however, though thus uniformly employed for the same purpose, is by no means uniformly of the same structure. In mammals, birds, and amphibials, it consists of lungs; in fishes, of gills; in the siren, an eel-shaped aquatic quadruped, the proper place of which in natural history has never yet been satisfactorily pointed out, of both gills and lungs; and in insects, of holes which are called stemmata or stigmata, of different shapes and numbers, in some kinds round, in others oval, and in others and more usually oblong like the figure of a button-hole. In the grasshopper they are nine on each side of the mouth; in the slug and snail we find only a single aperture, which is on the top of the head; while in different species of the monoculus and crab, they converge by four, five, or six into a cluster, which in some species is situate under the tail, in others in the claw, and in others again in the neck. In zoophytic worms we are not acquainted with the nature of this organ, although its existence is perfectly obvious; since all animals of this description die as soon as others if exposed to a perfect vacuum. It is probable that the common pores of the skin answer the purpose, and that the perspiratory and respiratory organ is one and the same. In plants the organ of respiration is the leaves: and hence if

oil or any other viscid substance that precludes a free entrance of the air be smeared over the skin of insects and the leaves of plants, both will equally perish for want of breathing.

Let us first attend to the physiology of this important function as it occurs in man and the more perfect animals, and next to its chemistry.

In order to delineate the physiology of this function, it is necessary to give a brief anatomical description of the several parts engaged. The bags of the pleura are filled by the lungs; by which we understand two viscera, one right and another left, in figure corresponding with the bags themselves which they fill, having a broad basis below, and being terminated above at the first rib by an obtuse cone. Anteriorly their surface is flat, laterally convex, and posteriorly it is rounded; internally it is concave, especially that of the left lungs, for the purpose of containing the heart. The right lung is the largest, and is most frequently divided into three lobes, which is seldom the case with the left. They are freely suspended by the great blood-vessels. Between the lungs and pleura is found a watery vapour, of a coagulable nature, like that of the pericardium; which transudes from the surface of the lungs and of the pleura, continually in the fœtus, and not unfrequently in the adult. In dropsy, this vapour is increased, or thickens to a kind of sebaceous matter; or, lastly, it concretes into fibres, forming adhesions of the lungs.

The external membrane of the lungs is simple, and thinner than the pleura, although continuous with it. It spreads from the adhesion of the great blood-vessels of the heart, over the lungs in every direction, and when entire, may be easily inflated, even after being separated from the lungs. The same membrane passes over the intervals between the lobules, like a bridge. It is joined to the lungs by cellular texture.

The lungs are made up of lobes separated by intermediate intervals, in which there is loose cellular substance. Their first division is into two large lobes, and one middle one of a smaller size, which, however, cohere together: they are afterwards repeatedly subdivided into successively smaller lobes, always surrounded by cellular membrane, till at last the lobules are resolved into very small membranous cells, which in adults are filled with air, are of various figures, and communicate on all sides with each other. The elementary parts of the lungs, therefore, are not oval bags, surrounded by muscular texture, with a single orifice which receive the air from the windpipe, but they admit the air exhaling from the ultimate branches of the trachea, so that being effused into irregular spaces, it passes and repasses freely from any one portion of the lungs into all the others. This is demonstrated by inflation, for air blown into any, even the most minute lobule, through its branch of the trachea, passes into all the rest. In man, and in the smaller animals, the cellular fabric of the intervals is neither shut up from the vesicles of the lungs, nor are the lobes surrounded by any peculiar membrane; in the largest animals, there is no communication between the air vesicles and the cellular spaces which surround the lobules.

The air passes into these vesicles through the wind-pipe. The wind-pipe arises from the larynx, and receives the air through it alone. Its first part is single and simple, partly fleshy and partly cartilaginous, the œsophagus lying below it and to its left, is supported on the broad and flat vertebræ of the neck; in other words, within the cellular substance that surrounds the wind-pipe there is situated a canal, composed of alternate cartilaginous and muscular rings. The cartilaginous rings, thin and elastic, anteriorly somewhat flat and thick, are joined together by their posterior extremities, which are thinner; and the circle is completed by strong transverse muscular fibres, adhering to both the loose extremities of the cartilage. The lower circles are less the uppermost is often augmented by an appendix, that next to the division is perpendicular.

The fleshy ring, situated alternately with the cartilaginous ones, are composed of red muscular fibres. Some of these are transverse, connecting the detached ends of the annular cartilages; others descend from each upper to the next lower ring. But other muscular fibres again, descend from the cricoid cartilage, and having reached below the division of the bronchia, vanish upon the lungs. The transverse fibres contract the wind-pipe; the longitudinal ones shorten it. Within the lungs, between the imperfect rings, there is a sort of muscular fabric, but less uniformly disposed.

In the cellular coat which surrounds the muscular one, but especially behind, in the interval between the cartilages, are placed numberless simple glands, which, by very small ducts, like pores, opening into the cavity of the wind-pipe, deposit within that cavity a watery and pellucid mucus, not coagulable into films, and very bland, which is of the greatest use in defending the exceedingly sensible membrane from the impurities of the air, which is loaded with particles, irritating bytheir mechanical figure or chemical acrimony. Numerous conglobate glands are situated around the trachea and its bronchia, but these are of the lymphatic kind, although their black fluid frequently penetrates into the trachea. Lastly, the internal tube of the wind-pipe is lined by a membrane, covered by epidermis, continuous with the skin and membranes of the mouth, smooth, soft, and very irritable. It is connected with the muscular coat by cellular substance.

The vessels of this entire part of the wind-pipe, in the neck, come from the lower thyroids; in the thorax, from other small branches of the subclavian trunks, or the mammaries, or the bronchials properly so called. Its nerves, arising from the recurrent and intercostals, are numerous.

In the upper part of the thorax the wind-pipe is received between the laminæ of the posterior mediastinum; and at the third vertebra, or a little above, is divided into two branches similar to the trunk, formed in like manner of imperfect cartilages, and furnished with similar glands; each of these enters the lung to which it corresponds, and the right is something shorter and larger than the left. Having entered the lungs, the cartilaginous rings gradually degenerate into fragments, become more angular, triangular, and intermixed with a larger portion of membrane, till at length, by the diminution of the cartilages, the ultimate branches of the bronchia become membranous.

Its ultimate branches are invisible, and exhale air into the cellular spaces of the lungs in adults, and from the same spaces receive the arterial expired vapour.

The vessels of the bronchia are the bronchial veins and arteries. The latter are generally two; one coming from the upper intercostal of the aorta, which is distributed either to the right only

or to both the lungs; the other, from the trunk of the aorta, goes to the left lung. Sometimes there are more; as when there are three, by the addition of a second from the aorta. At other times, there is only one artery common to both lungs. The thoracic part of the bronchia, situated without the lungs, has its proper vessels from the aorta, or from the subclavian, or the mammary, or the intercostal. The bronchial veins are very commonly two; the right from the vena azygos, the left from a peculiar branch of the subclavian vein, the left superior intercostal. These blood-vessels accompany the branches of the trachea, and descend into their membranes; the arteries inosculate with the pulmonary arteries, and the veins with the veins, forming a vascular web in the internal cellular substance. There are some instances where the pulmonary vein itself has given small branches to the lungs, to the wind-pipe, and to the surface of the lungs.

But there are other larger vessels belonging to the lungs, the pulmonary artery, and the vein. The great artery, in the fetus larger than the aorta, and in the adult but little less, has two branches; the right larger but shorter, the left narrower and longer. In the fetus, the trunk itself is continued into the descending aorta, and is known by the name of ductus arteriosus. In the adult, that trunk degenerates into a solid ligament. The four pulmonary veins accompany the branches of the artery and of the trachea, through the lungs, surrounded by a good deal of cellular substance; which substance, being increased, at last composes the lungs themselves. Within this cellular fabric, the air-vessels and blood-vessels are subdivided, and in the ultimate cellular spaces, the ultimate veins and arteries spread, reticularly interwoven; and here the small arteries exhale a plentiful vapour into the aërial cells of the lungs, and the veins absorb a watery vapour from them. Hence, coloured water, the whey of milk, or thin wax, being injected into the pulmonary artery, flows with froth into the wind-pipe; or, on the contrary, penetrates from the bronchia into the pulmonary artery. In like manner, injections pass from the pulmonary vein into the bronchia; or thence, into the veins: lastly, they readily pass from the arteries into the pulmonary veins; or return from the veins into the arteries.

The lymphatic vessels, as in other parts, form a net-work upon the surface of the lungs, whence branches run to the cavity of the posterior mediastinum, to the glands seated on the œsophagus, and to the thoracic duct. The nerves are small, especially the anterior, the posterior ones being somewhat larger: they come from a nerve of the eight pair: but they receive some addition, accompanying the large blood-vessels, from the recurrent, and likewise from the cardiac plexus. Hence the lungs have but little sensation; but that of the little nerves, divided upon the substance of the bronchia, is very acute. Nor are the lungs of an irritable nature.

The quantity of blood which enters into the lungs is exceedingly great, equal to (or even perhaps greater than) that which is sent in the same time throughout the rest of the body; which, therefore, indicates this viscus to be subservient to some very important purpose. That this use depends manifestly upon the air, appears from the universal consent of nature, in which we scarcely find an animal which does not respire; also from the structure of the lungs in the fetus, in which being useless, on account of the absence of air, they receive only a very small portion of that blood, which the pulmonary artery conveys from the heart. We come now to speak of respiration, or the inhalation and expulsion of air by the lungs.

Air, physically considered, is an element, fluid, invisible, elastic, with an indestructible spring, and soniferous. But the air, which we commonly receive into the lungs, is impure, filled with a great quantity of watery and other vapours, as also with salts, acids, &c. with the seeds of plants and animals, and other foreign particles; and is ponderous; weighing, however, 850 times less than water, a cubic foot of air being between 610 and 694 grains. This air, which surrounds the earth on all sides, being compressed by its incumbent columns, perpendicularly and laterally, enters with great force wherever it meets with less resistance, as appears from experiments made in vacuo, and from the phænomena of the air-pump: so that its pressure on the human body is not less than 30,000 pounds. It is repelled chiefly by the pores of membranes, though these are permeable by water: it likewise penetrates oil or mucus with difficulty.

The ambient air is excluded from all parts of the human body, by dense skin, which, even when dry, is impervious to the air; by the fat lying under it, by the narrowness of the absorbent vessels, and by the equability of the resistance. We must investigate why the air enters the lungs, which, in an adult, are always filled with air, and therefore resist the pressure of the whole atmosphere with an equivalent force. That the lungs always contain air is evident; because, however you compress them, they are still lighter than water; and even after they have been inflated but a few times, they always swim; whereas, in the fetus, before air has been admitted into them, they sink to the bottom.

On the equilibrium being destroyed, the air invariably descends in every direction to that place where it meets with least resistance. But air that is dense and heavy descends more easily than that which is light, whose force scarcely exceeds that of the air in the lungs, nor is able by the same force to overcome the resistance of the bronchia, and of the force by which the air contained in the lungs is compressed. Hence an animal lives with greater ease in a dense than in a light atmosphere; although that air is always better tolerated, which is pure in proportion to its levity; such as that of the highest mountains of the Alps. Therefore, that the air may enter the lungs, they must make a less resistance to it than before; namely, the air, which is already in the cellular fabric of the lungs, must be rarified; but this effect will be produced, if the cavity of the breast, which is filled by the lungs, be dilated. The air, which is always in the lungs, expands into this increased space, by which, being weakened in its spring, it makes less resistance to the external air; consequently, a portion of external air descends into the lungs, sufficient to restore to the air, now contained in the lungs, the same density with that of the external air.

We must, therefore, describe the powers which dilate the breast. The breast or thorax is composed of bones, muscles, and cartilages; being almost of the shape of an elliptic barrel, somewhat compressed before, but behind divided by an eminence, whose hoops are the ribs, and of remarkable strength. In the lateral parts of this structure, the lungs are situated; the central and

lower parts contain first the pericardium, and then some of the abdominal viscera.

The basis of the thorax is formed by a column, a little curved, at the upper part gibbous backwards, so that its summit is situated most behind. To this twelve vertebræ are affixed. But they also coalesce, by the union of their bodies into a single column, which projects forwards between the two cavities of the breast; divides the right from the left; and is plain in the fore-part, and broad towards the sides. A slight sinuosity receives the ribs into that place where the arch separates from the body. They are bound together into one column, both by the elastic plate interposed between the bodies of every two, and coalescing with both; and by other ligaments and spines lying upon one another, and by the junction of the ribs; on which accounts they scarcely admit of motion amongst themselves. The sides of the breast are formed of twelve ribs. These are in general bent in the form of an irregular arch, having a considerable curvature laterally and backwards, but extending in their fore-part towards a right line. The bony parts of the ribs are, however, parallel with each other. The greatest part of the rib is bony; of which the posterior portion is round and thick, and the anterior thin and flat. The anterior remaining part of the rib consists of a cartilage; which in general preserves the figure of the rib, broad, flat, adhering to an irregular hollow of the bony part; and which does not change into bone, unless in extreme old age.

The posterior, bony, and thick part of each rib terminates in a head. These are inserted into pits scooped out of the bodies of the uppermost and two lowermost vertebræ, and in the contiguous margins of each of the other two. The vertebræ are tied to the ribs by strong ligaments, of which the principal is distributed upon each adjacent vertebræ, in a radiated manner from each rib; other ligaments tie the transverse process to the tubercle of the rib, and others connect the contiguous ribs, and also the transverse processes, with each other. Moreover, between the angle of incurvation and the articulation with the vertebræ, each of the ten upper ribs has a tubercle, which, being connected with the plain side of the transverse process of the corresponding vertebræ, are tied by short and strong ligaments to that process, in such a manner, that, while the juncture is very strong, the rib can ascend and descend for a short way.

Of the anterior cartilages, the seven uppermost reach to the sternum, and strengthened by short ligaments, they enter with a double head into lateral depressions in that bone, which are incrusted with cartilage. Of the five remaining ribs, the uppermost is agglutinated by strong cellular substance to the seventh, and each lower one to the one immediately above it, so that they form a continuous margin, which is itself fastened to the sternum. The cartilages are connected with each other, both by proper ligaments, and by cartilaginous appendages joined by cellular substance: the two lowermost are free, and connected only with the muscles. These inferior cartilages are united to one another, and to the sternum, by strong ligaments.

The first rib is the shortest and most solid. As they follow in succession to the seventh and eighth, every two of them form larger and more moveable circles. The eighth is the longest of all; and below it, they always become shorter, the lower they are.

The upper rib descends; the second joins the sternum almost at a right angle, while the others ascend both to the vertebræ and to the sternum, but more to the latter. The bony part of the ribs is placed in such a direction, that the uppermost have their anterior surface declined forwards, almost transversely. About the third rib it is placed almost perpendicularly; and below the middle ones, it projects a little forwards. Besides, the strength of the ribs is very different. The uppermost, being short, transverse, rather united than articulated with the sternum, and, lastly, often consolidated, make the greatest resistance. The mobility of the lower ribs increases successively to the lowest, which, adhering only to muscles, moves most freely of all.

The sternum, in general, is a thin spongy bone, in adults of a single piece, but in the fœtus variously multiplicate. Its upper part is broader, octagonal, and supported by the clavicles, which are united with it by a triangular head, and very strong articulation, and by the first rib on each side. The next part, which is longer and narrower, grows broader downwards, and its sides receive the ribs into proper angular cavities. The lower part, which is less and shorter, is obtusely shaped like a tongue. This is continued into a detached appendage, partly bony, and partly cartilaginous, which is called the ensiform cartilage; of various shapes, being sometimes obtuse like a little tongue, sometimes pointed, sometimes bifid, and sometimes perforated.

In order, therefore, to dilate the seat of the lungs, and thus to produce that condition which causes the external air to descend into the lungs, the thorax must be elevated. For thus all the sections of the thorax form right angles, and its capacity is increased. This motion is performed by various muscles, which either operate constantly, or only at certain times. The whole of the intercostal muscles always elevate the ribs. Under this name we comprehend 22 muscles; of which 11 are external, or subcutaneous; and as many internal, separated from the pleura only by fat and cellular substance. The origin of the external intercostal is at the posterior articulation of the ribs; their anterior termination is in the bony part of each rib, at some distance from the cartilage, so that the remaining space between the cartilages, all the way to the sternum, in place of the muscles, is filled with an aponeurosis. Their direction is such, that they descend obliquely forwards, from the lower edge of the upper rib to the upper edge of the lower rib. Almost all authors agree that they elevate the ribs; because they descend from the upper and more fixed, to the lower and more moveable rib, in such a manner, that their lower point lies more distant from the vertebral articulation, or fulcrum of the lever of the ribs.

But the internal intercostals arise at some distance from the vertebræ, near the outside of the tubercles. From thence they proceed as far as the sternum, into which the first of this kind are inserted above. Except the anterior part of the first internal muscles, their direction is contrary to that of the former; so that they descend backwards, from the lower margin of the upper rib, to the upper edge of the lower rib. Therefore their action is disputed, because their lower insertion is made into a point of the rib, nearer its articulation with the vertebræ, which, therefore, seems to be the least moveable: however, they elevate the ribs notwithstanding this; for the immobility of the upper rib, arising from its articulation, weight,

and ligaments, far exceeds the mobility produced by its greater distance from the fulcrum. This is proved by the dissection of living animals; in which it appears, that the internal muscles act during the elevation of the ribs, and rest when they are depressed; by threads fixed to a flexible human skeleton, and drawn in the direction of the internal intercostal muscles, which always and invariably raise the inferior rib towards the superior; and by the firmness of the upper ribs, which serve as a fixed point to the lower ones: for the first ribs are from eight to twelve times less moveable than the other true ribs; while the difference of distance from the centre of motion, is scarcely the twentieth part of the whole lever. And lastly, by experiment on the dead subject; for, on raising its thorax, the internal intercostals swell.

By the action, therefore, of these muscles, the thorax is elevated, not altogether as one machine, nor would respiration be assisted by such a motion; but the ribs, turning upon their articulations, behind are but little moved, while with their anterior extremities, they descend and form larger angles, both with the sternum and vertebræ; and in the middle of their arches, they ascend and raise their lower edges forwards. At the same time, the sternum is thrust forward from the vertebræ and from the junctures with the ribs. Thus the ribs are both farther from the vertebræ, and the right ribs recede from the left; and both diameters, from the right to the left, and from the sternum to the vertebræ, are increased by almost two lines each: and as this occurs in every imaginable section of the thorax, the cavity of the breast will be sufficiently dilated. This happens especially in women, and in men whose breathing is somewhat laborious. These effects are produced least of all by the first ribs, but more by the succeeding ones. In strong inspirations, the ribs descend both behind and before, and, along with these, the sternum; and the spaces between the cartilages are lessened. But this dilatation is neither sufficient for healthy respiration, nor is it almost observable in men; although, even then, the intercostal muscles, by retaining and elevating the ribs, very much assist the inspiration in a secondary way, by affording a fixed point to the diaphragm, so that the whole force of that muscle may be spent, not in depressing the ribs, but in lowering itself. The greater part, therefore, of the space which the thorax gains in inspiration, arises from the action of the diaphragm.

By the diaphragm we understand a muscle expanded in a curvilineal plate, which, in general, separates the pulmonary bags from the abdomen in such a manner, that the middle and tendinous part is the highest, and supports the pericardium; that the lateral portions, which arise from the solid parts of the thorax and loins, are every where lower; and that its posterior portions are lowest of all. The fleshy fibres of this muscle arise from the internal or posterior surface of the ensiform cartilage to the very point, and from the sixth, seventh, eighth, ninth, tenth, eleventh ribs, and apex of the twelfth; after which follows an interval, in which the naked pleura is contiguous to the peritonæum. Thereafter muscular appendages of the diaphragm, much stronger, collected into two, three, or four round muscles on each side, arise fleshy from the transverse process of the first lumbal vertebra, and from the side of the body of the second; and tendinous from the middle of the body of the second, third, and fourth, and from the cartilages placed between them, on the whole higher up in the left side, and lower down in the right.

All these fibres, becoming tendinous, form the centre of the diaphragm, which resembles, in figure, a trefoil leaf, and supports the pericardium with its middle and broader angle, while the lateral wings, of which the left is narrower, descend backwards. This central portion is more moveable than the rest; but in the middle tendinous part, and neighbouring muscular substance, it is resisted by the heart; the lateral wings and contiguous portions are the most moveable. The fibres of this tendon form a most beautiful web, principally indeed on the upper part; which stretches from each muscular portion, to the muscular portion opposite to it; and then they form remarkable inferior fasciculi, transverse, right, left, and posterior, which last portion is the uppermost.

There are two holes in the diaphragm; of which the right, in the right side of its tendon, is obtusely square, and circumscribed by four strong tendinous fasciculi; the left, which is elliptical, lies betwixt the right and left fleshy portions, arising from the middle of the bodies of the lumbal vertebræ; under this opening they decussate and cross each other once and again, but above they end in the tendon. Therefore it is probable that the latter is contracted during the action of the diaphragm, and that the former remains immoveable: for tendons are but little changed during muscular motion.

The structure of the parts, and the dissection of living animals, demonstrate, that the fleshy portions of the diaphragm, by ascending on all sides from fixed points to middle and moveable parts, depress these, and by that means draw downward the lateral bags of the thorax, which contain the lungs; and thus augment the perpendicular diameter of the breast. The muscular portions are more depressed; the tendon less, both because it is fixed to the pericardium, and because its own substance does not contract. The œsophagus, and even the vena cava, are compressed, while the diaphragm acts. The diaphragm almost alone performs the office of respiration in a healthy man who is at rest; and also in those whose ribs are fractured, or the sternum burst, or where the person will not make use of his ribs on account of pain. The force of the diaphragm also, in dilating the breast, is greater, according to calculation, than all the rest of the powers which contribute to respiration. The extent of an inspiration is thus far limited, because, during the extreme action of the diaphragm, the lower ribs are drawn inwards, and the breast is so far straitened. To oppose this, the intercostal muscles interfere in a moderate inspiration; in an excessive one they are not equal to the diaphragm. The phrenic nerve, when irritated, more evidently than in most other muscles, forces the diaphragm to perform its office. The lungs themselves are entirely governed by the air, ribs, and diaphragm; being in immediate contact with these, as appears through a large incision, or through the pleura, or pellucid part of the diaphragm, when the containing parts remain entire.

In violent inspirations, occasioned by an increased quantity of blood driven into the lungs, or by any obstacle occurring in them, several other powers elevating the thorax, assist in dilating the breast, which are inserted into the thorax, clavicles, or scapulæ; such as the scaleni muscles, mastoïdei, trapezii, cervicales descendentes, serrati

superiores, pectorales, and levatores parvi, for which anatomy must be consulted.

Thus, there are powers which increase the capacity of the thorax in all its three dimensions. By these the cavity of the breast is dilated, so that it compresses the lungs less than before: into that space the lungs strive to extend themselves, since they are never destitute of air, which, as soon as the pressure is taken off, becomes rarified, and expands itself. Independent of the action of the muscles, the lungs possess no peculiar inherent power of attracting air: and, even when they are most full of air, on closing the trachea, the animal, however, attempts to inspire, by the efforts of its intercostal muscles and diaphragm. It follows, that the air gravitating, and pressed on all sides by the incumbent columns of the atmosphere, must enter the thorax; and with greater force the less air is in the lungs; and with the greatest, if they contain no air: but air will not enter the thorax, if the air, being admitted to the lungs through a wound in the breast, compress their surface. In this action, therefore, which is called inspiration, the bronchia are every way increased, both in length and breadth; because all the diameters of the thorax are increased, and the inflated lungs remain immediately contiguous to the pleura. At the same time, the vessels, which are joined with the bronchia by a cellular sheath, become longer and are extended, and the small angles become larger; by which means, the circulation is facilitated. Besides, when the vesicular substance of the lungs is filled with air, the space through which the capillary vessels of the lungs run is increased, the branches of the arteries and veins are stretched out at greater angles, the lobes press less upon each other, the compression of the neighbouring parts is lessened, and, therefore, the blood sent from the heart will flow with greater ease and celerity through the large and small arteries of the lungs. Hence, by inflating the lungs, and by that means facilitating the passage of the blood to the left ventricle, moribund animals are resuscitated, and in the same way persons who are taken out of the water apparently drowned. But, on account of its great levity, the pressure of the air upon the blood does not deserve notice, as being three hundred times less than the force of the heart; and insufficient to force the air against the blood, which may easily be done by a syphon.

Is air contained between the lungs and the thorax? Is this air rarified in inspiration, and afterwards becoming condensed, and compressing the lungs, does it cause exspiration? Is this opinion confirmed by the analogy of birds, of which it is strictly true? Every thing concurs to confute this opinion: behind the pleura, in living quadrupeds, as well as in dead human bodies, the naked lungs are visible, without any intermediate space betwixt them: on perforating the pleura, the lungs retract themselves towards the vertebræ as soon as the air comes in contact with them. In birds, the lungs, being pervious, admit the air through large holes into the cavity of the thorax. But in these there is a manifest space betwixt the lungs and the pleura, which would be equally manifest in quadrupeds, if the lungs were not contiguous with the pleura. Large wounds, admitting the air into one cavity of the thorax only, diminish the respiration; but such wounds, as let the air into both cavities, suppress it. When the thorax is opened under water, it emits no bubbles of air through the said water; but in birds, in whose thorax there is air, it does. The imaginable space betwixt the lungs and the thorax is filled by vapour, or a very little water. Adhesions of the lungs injure the respiration but in a small degree; which ought entirely to cease, if any intermediate air betwixt the lungs and thorax were necessary to respiration. Finally, the external air, being admitted to any of the membranes of the human body, inflames them, if they be not defended by plentiful mucus, and of this the pleura is destitute.

Respiration, whether by the admixture of a subputrid vapour, or in some other way, certainly vitiates the air, and renders it unfit either for inflating the lungs or supporting flame; and lastly, it deprives that element of its elasticity. It is probable that this happens from putrefaction, since by a crowd of men the air is rendered pestilential, and fevers of the most malignant kind are generated in a few hours. In whatever way it happens, we are certain, that, in the lungs, the air is vitiated; loses its elasticity; and cannot keep the lungs distended, so as to transmit the quantity of blood now increased by the dilatation of the pulmonary arteries, into the veins. Nor can the will dilate the breast beyond certain bounds, or assist the passage of the blood. A state therefore will take place, in which the blood cannot pass through the lungs,

Thus a new resistance to the blood continually coming from the heart is generated: and in long retentions of the breath, as in making violent efforts, the venous blood, especially of the head, stagnates before the right ventricle of the heart, which is closed up, because it cannot evacuate itself into the lungs; and tumefies the face with redness, and sometimes bursts the veins of the brain, neck, intestines, kidneys, or lungs, and even the right auricle of the heart. This is the cause of excessive anxiety of mind; this is the cause of death in compressed air, in persons drowned or strangled, which is much more sudden than is commonly imagined with regard to drowned people. A living person, therefore, that he may remove those inconveniences which arise from the passage of the blood being obstructed, slackens the powers of inspiration, and excites to action those of expiration, in order to free the breast from the too greatly rarified air.

These powers are, first, the elasticity of the ribs, which being drawn upwards out of their natural situation, as soon as the elevating powers cease to act, spontaneously replace themselves at more acute angles with the sternum and vertebræ. There is also the elastic force of the bronchia and vesicles distended with air, by which they endeavour to contract. Hence exspiration is performed more easily and quickly than inspiration; and hence it is the last action of dying people.

These are assisted by the abdominal muscles; the oblique, straight, and transverse. The former of these are fastened by one part to the lower ribs; and by another part they are attached to the os pubis and ilium, which are immoveable, when compared with the breast. Therefore the straight muscles, being contracted, flatten the arch into which the abdominal viscera were protruded by the depression of the diaphragm, reduce the convexity of the abdomen nearer to a straight line; force the abdominal viscera upwards and backwards against the diaphragm, which alone can give way; and press it up into the thorax, which is thus rendered shorter. The oblique muscles, for the same reasons, compress the lateral parts of the abdomen, carry the liver and stomach backwards, and press

them towards that place where there is the least resistance. Lastly, all of them draw down the ribs which were elevated by the intercostals. The transverse muscles, indeed, do not draw down the ribs; but they pull the cartilages of the false ribs a little inwards, render the whole abdomen much narrower, and force the same viscera against the diaphragm. As accessory powers may be reckoned the sternocostal, and the long internal intercostal muscles, which are called depressors. By this joint force the elevated ribs descend; the middle ones more, the uppermost less, the lowest most of all; their margins are drawn inwards: the cartilages ascend, and return into acute angles with the sternum; and the sternum itself recedes backwards with the ribs. By these means the thorax is rendered narrower in every direction and shorter, and expels as much air out of the lungs as is sufficient to remove the uneasiness.

In violent respiration, when the inspirations are fuller, the more powerful exspirations derive assistance from some other causes, as the sacro-lumbalis, longissimus and quadratus muscles. By this force, leaden bullets, weighing above a drachm, may be blown to the distance of 363 feet; which force is equal to a third part of the pressure of the atmosphere. But, in a healthy person, the muscles of the abdomen alone suffice, and the lungs are not so much emptied as in blowing.

The effects of exspiration are the compression of the blood-vessels of the lungs; the diminution of the angles of the bronchia; the resting the weight of the adjacent vessels on the reticular vessels; the expulsion of the corrupted air from the lungs; the propulsion through the veins of that part of the blood, which is impacted in the capillary arteries, to the left side of the heart, and the impeding that part of the blood which is coming from the right ventricle. Exspiration, therefore, stops the ready entrance of the blood into the lungs; and as the whole thorax is compressed at the same time, it repels the venous blood into the veins of the head and fills the brain and its sinuses.

In this manner the necessity for respiration arises anew, as often as the collapsed vessels of the lungs resist the blood expelled from the right ventricle of the heart: this is one cause of death in those animals which expire in vessels exhausted of air. The lungs in those which have remained long in vacuo, from having the air drawn out from them, become dense, solid, and heavier than water; and, therefore, impervious to the blood. Of the same kind is the death of those who are killed by lightning, and perhaps by the noxious vapours of caverns. Therefore, in consequence of a most intelligent structure, at the first perception of the uneasiness arising from the opposition to the passage of the blood through the lungs, the exspiring powers become relaxed, the inspiring powers are excited into action, and the motion of the blood through the lungs is rendered free and accelerated.

Are there other causes of alternate respiration? Is any thing to be derived from the compression of the vena sine pari, of the phrenic nerve, or from the blood not being sent to the brain? But these are disproved by comparative anatomy; which, where there is no such nerve or vein, finds the same alternation in respiration every where. Does it proceed from the alternate contraction of antagonist muscles, among which, those of exspiration relax those of inspiration, and the reverse? But, according to this argument, all the muscles of the human body would be perpetually alternating in their motions.

From what has been said, it sufficiently appears, that respiration is absolutely necessary to a healthy adult; because, whether the lungs remain long in a state either of exspiration or of inspiration, death will be the consequence. Therefore no animal, that has lungs like ourselves, after it has breathed for some time, so that the air shall have penetrated into the inmost parts of the lungs, and the pulmonary artery shall have brought a new quantity of blood to that viscus, can subsist longer than a few minutes without the use of air, without perishing, or at least falling into a state which differs from death only in the possibility of recovery. In an animal recently born, this necessity for air does not take place very instantaneously.

But the use of respiration is different from this necessity; which nature might have avoided, either by forming no lungs at all, or by constructing them similar to those of the fetus. The use, therefore, of respiration must be very considerable, since all animals are furnished either with lungs, or with gills, or with a wind-pipe distributed through all parts of the body.

To investigate this utility, let us compare the blood of the adult with that of the fetus, and with the vital fluid in fishes. It appears, that in the fetus the blood is destitute of its florid redness and solid density; that the blood of fish is cold, and has less density, and a tender crassament. It is therefore probable, that the blood acquires both these properties in the lungs.

Is animal heat generated principally in the lungs? Does it arise from the alternate extension and contraction, relaxation and compression, of the vessels, by which the solid parts of the blood are perpetually rubbed together, and suffer attrition from their constriction? The lungs, therefore, will add to the office of the rest of the arteries, because in them the blood is alternately relaxed and compressed more than in any other part of the body. But when the lungs are obstructed, ulcerated, and almost destroyed, morbid heat is increased in the human body: and in the lungs, the cold air comes most nearly in contact with the blood.

The density is, indeed, promoted by the copious discharge of watery vapour from the vessels of the lungs, by which the rest of the mass becomes specifically heavier. In the same manner as in other arteries, the blood, being alternately retarded and accelerated, is figured by the moulds of the ultimate arteries, becomes spherical, and therefore denser, having more ponderous globules, and less light fluid. The pulmonary vein also being smaller than its corresponding artery, is of considerable use in compressing the globules, and in increasing their attraction. Nevertheless, cold animals, with very small lungs, have dense and coagulable blood; as also the chick in ovo. The course of the blood through the lungs is shorter: through the whole body the course is longer, and the artery weaker; the ventricle by which the blood is propelled, is also weaker.

Is the air itself received into the blood in the lungs, and does it there produce necessary vibrations? Is this demonstrated from the resistance of the body to the weight of the external air; from the air found in the blood-vessels, in the cellular substance, and in the cavities of the human body; from the cracking produced by extending the joint; from air being manifestly poured from the trachea into the hearts of many animals, as the

locust; from the escape of air from the blood and animal fluids in Mr. Boyle's vacuum; from the necessity of a vital oscillation in the blood; and from the increased redness of the pulmonary blood?

That no elastic air is here received into the blood, is demonstrated from its not being able to enter into the blood, if it retain its elasticity; from the inutility of its reception, if its elasticity be lost in the blood; from the perfect immutability of the blood by cold; from the minuteness of the inhaling vessels; from the sides of the vesicles being perpetually covered with mucus; from the elastic nature of air being unfit to pass through capillary vessels; and from its repulsion by water, that hinders it from passing through moistened paper, linen, or leather. Again, air thrown into the trachea never passes into the heart; or only when it is driven with excessive force. In the vessels and humours of the human body, air, from a state of inelasticity, becomes elastic in consequence of putrefaction, frost, or an external vacuum. But such air exists in every liquid, and is taken into our bodies with the aliments, and with vapours, mixing slowly and difficultly. There never were any elastic bubbles of air observed in the blood of a living animal, unless after wounds; air being inflated into the blood-vessels of any animal, kills it certainly and speedily. Nor is there any thing sufficiently certain in the increased redness of the blood in the pulmonary veins. Lastly, air indeed is absorbed by most fluids, and by water, but slowly, and only at the end of several days after the former air has been exhausted by the pump. It then likewise lays aside its elastic nature; and no reason has been advanced why the air should either be more speedily absorbed by the blood, or why it should retain its elasticity after its absorption.

Is the blood cooled in the lungs? Is this proved from the death of animals in air heated to the same degree with the animal, as is believed to have happened from very sultry summer weather, and scorching east winds? Are the pulmonary veins, therefore, less than the arteries? Does the desire of cold in hard-working people arise thence? That the blood is cooled in the lungs, is thus far true, that it warms the contiguous air, and therefore imparts to it something of its own heat. But that this was not the design of nature, is evident; since no one has said, that the venous blood is hotter than the arterial, although some assert that it is colder; and nobody ever observed the left ventricle of the heart colder than the right. But the venous blood enters the lungs. If it be cooled there, it follows that the arteries must receive it still colder. Therefore, the blood recovers that heat which it lost, and even more: and besides, a person may live in an air much hotter than the blood itself, of which we have a familiar example in baths, and warm climates. The size of the pulmonary artery in the fetus, which does not respire, is greater; and the larger area of the right auricle and ventricle of the heart, which is likewise much greater in the fetus, seems to be a receptacle subservient to frequently necessary retardations, and the narrowness of the vein contributes to the acceleration of the blood.

Does the blood derive its redness from the air? This is contradicted by what we see in cold animals, which though they make almost no use of the air, have blood equally red with that of warm animals; by the certain connection of redness in the blood of frogs, with their having plenty of food, and of paleness with want of food; and by the air, as we have just now said, having no access to the blood. Nevertheless, redness is produced, and restored to the blood by the contact of air, and is destroyed by its removal. Does some subtle element from the air penetrate the blood, and cause its colour, as light is required for the colours of plants?

Why do tortoises, frogs, lizards, snails, earwigs, and many other insects, live long without air? In them, the lungs are given, not so much for the preparation of the blood, of which they have but a small quantity, as for assisting them in swimming; hence their lungs are supplied with veins from the cava, and with arteries from the aorta. Insects inhale and exhale air, through points in the skin. Why do all animals, however small, such as little birds, perish in air that is not renewed? Because the air, which has once entered the lungs, is contaminated by inelastic, watery, and alkaline vapours, and therefore it becomes noxious: not because it becomes lighter; for the mercury falls but little in air, which has not been renewed, and which has killed an animal. Hence, on the other hand, animals survive longer in air which is more compressed than that of the atmosphere: for in that case, the proportion of the elastic element is greater, and therefore the air is more slowly contaminated. But, even in other cases, confined air becomes deleterious, and filled with vapours, by stagnation alone. Why do animals swell in an exhausted receiver? From the expansion of the air, which existed in an inelastic state in the blood.

There is a certain connection between the pulse and respiration. According to the common course of nature, three or four pulsations are reckoned to one respiration. If the quantity of blood sent to the heart be increased, the frequency both of the pulse and respiration, are increased also. This is the reason of the panting in a person taking exercise, which accelerates the motion of the venous blood. If the blood meet with much resistance in the lungs, and do not pass freely from the right into the left ventricle of the heart; to accelerate its course, both the number and magnitude of the respirations are increased. This is the cause of sighing, yawning, and panting; of which the first is a deep inspiration; the second slow, and very great; and the third, frequent and imperfect. The number of respirations, however, does not increase with the pulse; of which we have an example in fevers, in which the lungs are not affected.

The mucus, which lines the sensible membrane of the bronchia, may become troublesome, both by its quantity and acrimony; it has been even known to cause suffocation in a dropsy of the lungs. Therefore, its superabundance, adhesion, or acrimony, is removed by coughing; namely, by irritating the respirative system, the mucus or concretions are loosened and expelled by large inspirations, and exspirations, alternately following each other with rapidity, and by strokes of the abdominal muscles.

Laughter differs from coughing in its cause, which resides commonly in the mind, or at least, consists in the titillation of some of the cutaneous nerves; and also, because, after one deep inspiration, there are frequent but imperfect exspirations, through the contracted glottis, and the air is not totally evacuated from the lungs. Hence laughter, in a moderate degree, conduces to health; because, in place of one full inspiration, several inspirations and exspirations happen in the same

time, and thus the concussion is greater. Hecne its danger, from stagnation of the blood; because the exspiration is not full, and therefore the blood is admitted into the pulmonary artery, but is not suffered to pass through it. Weeping begins with a deep inspiration, after which follow short alternate inspirations and exspirations; and it is finished with a deep expiration, which is immediately followed by an inspiration; hence it has nearly the same good and bad effects: and when moderate, it relieves the distress arising from grief. Hiccough is a very great, sonorous, and sudden inspiration. Sneezing consists of one deep inspiration, succeeded by a singular powerful exspiration; and by the torrent excited, the acrid matter, irritating the nostrils, is blown away.

The secondary uses of respiration are very numerous. It exhales copiously, and removes from the blood something highly noxious; for by remaining in the air, it will cause suffocation; and the breath of many people, crowded in a close and small place, impregnates the air with a suffocating quality. On the other hand, it absorbs from the air a thin vapour, of which the use is perhaps not sufficiently known. It is also a force, which perpetually compresses the abdomen, and all its viscera; it evacuates the stomach, intestines, gall-bladder, receptacle of the chyle, urinary bladder, intestinum rectum, and the womb; it comminutes the aliments, and forces the blood through the liver, spleen, and mesentery. It causes a kind of flux and reflux in the blood, so that it is alternately pressed back towards the extremities of the veins, and a little after is propelled towards the heart by an accelerated velocity, as into an empty space. Moreover, inspiration attracts the odoriferous particles from the air, and conveys them to the sensorium. But even sucking, so necessary to the new-born infant, is effected by inspiration, and by forming a larger space, in which the air contained in the mouth is rarefied, so that the pressure of the external air forces the milk into that part where it is least resisted. Lastly, the voice itself depends upon the air, and seems to be the principal manifest effect of respiration. Such are the chief physiological facts connected with this important function: let us next attend to its chief chemical facts.

The fluid respired by animals is common atmospherical air; and it has been ascertained by experiment that no other gasseous body with which we are acquainted can be substituted for it. All the known gasses have been tried: but they all prove fatal to the animal which is made to breathe them. Gasseous bodies, as far as respiration is concerned, may be divided into two classes, *unrespirable* and *respirable*.

Unrespirable gasses are of such a nature that they cannot be drawn into the lungs of an animal at all; the epiglottis closing spasmodically whenever they are applied to it. To this class belongs carbonic acid, and probably all the other acid gasses, as has been ascertained by the experiments of Pilatre de Rozier. Ammoniacal gass belongs to the same class, for the lungs of animals suffocated by it were found by Pilatre not to give a green colour to vegetable blues.

This active chemist ventured into a brewer's tub while it was full of carbonic acid gass evolved by fermentation. A gentle heat manifested itself in all parts of his body, and occasioned a sensible perspiration. A slight itching sensation constrained him frequently to shut his eyes. When he attempted to breathe, a violent feeling of suffocation prevented him. He sought for the steps to get out; but not finding them readily, the necessity of breathing increased, he became giddy, and felt a tingling sensation in his ears. As soon as his mouth reached the air he breathed freely, but for some time he could not distinguish objects; his face was purple, his limbs weak, and he understood with difficulty what was said to him. But these symptoms soon left him. He repeated the experiments often; and always found that as long as he continued without breathing, he could speak and turn about without inconvenience, but whenever he attempted to breathe the feeling of suffocation came on.

Respirable gasses on the contrary may be drawn into the lungs and thrown out again without any opposition from the respiratory organs: of course the animal is capable of respiring them. They may be divided into four subordinate classes. 1. The first set of gasses occasion death immediately, but produce no visible change in the blood. They occasion the animal's death merely by depriving him of air in the same way as he would be suffocated by being kept under water. The only gasses which belong to this class are hydrogen and azote. 2. The second set of gasses occasion death immediately, but at the same time produce certain changes in the blood, and therefore kill not merely by depriving the animal of air, but by the action of certain specific properties. The gasses belonging to this class are carburetted hydrogen, sulphuretted hydrogen, carbonic oxyd, and perhaps also nitrous gass. 3. The third set of gasses may be breathed for some time without destroying the animal, but death ensues at last, provided their action be long enough continued. To this class belong the nitrous oxyd and oxygen gass. 4. The fourth set may be breathed any length of time without injuring the animal. Air is the only gasseous body belonging to this class.

It has been long known that an animal can only breathe a certain quantity of air for a limited time; after which the air becomes a deadly poison, and produces suffocation as effectually as the most noxious gass, or a total absence of air. It was suspected long ago that this change is owing to the absorption of a part of the air; and Mayo made a number of very ingenious experiments in order to prove the fact. In 1757 Dr. Black, by breathing through lime-water, ascertained that the air when thrown out of the lungs contains carbonic acid. This discovery was still farther confirmed by Lavoisier in his first dissertation on respiration, published in the memoirs of the French Academy for 1777. Priestley and Scheele demonstrated that the quantity of oxygen in atmospherical air is diminished by respiration. It was afterwards proved by Lavoisier, and many other philosophers, who confirmed and extended his facts, that no animal can live in air totally destitute of oxygen. Even fishes, which do not sensibly respire, die very soon if the water in which they live be deprived of oxygen gass. Frogs, which can suspend their respiration at pleasure, die in about forty minutes, if the water in which they are confined be covered over with oil. Insects and worms, as Vauquelin has proved, exhibit precisely the same phenomena. They require air as well as other animals, and die like them if they be deprived of it. They diminish the quantity of oxygen in the air in which they live, and give out by expiration the very same products as other animals. Worms, which are more retentive of life than most other animals, or at least

not so much affected by poisonous gasses, absorb every particle of the oxygen contained in the air in which they are contained before they die. M. Vauquelin's experiments were made on the gryllus viridissimus, the limax flavus, and helix pomatia.

The quantity of air respired differs very much in different animals. Man, and hot-blooded animals, are under the necessity of breathing constantly; whereas amphibious animals have a certain power over respiration, and can suspend the function altogether for a limited time. Dr. Barley has ascertained that these animals acquire a much greater command over their respiratory organs by habit. Fish do not breathe at all, and consume so little air, that the small portion of it, held in solution by the water in which they swim, is sufficient for them. It appears that the number of respirations made in a given time differ in different men. Dr. Hales reckons them at 20 in a minute. A man on whom Dr. Menzies made experiments breathed only 14 times in a minute. Mr. Davy informs us that he makes between 26 and 27 in a minute. I myself, says Dr. Thomson, make about 19 at an average. The average of all is 20. Now 20 in a minute makes 28,800 in 24 hours. The quantity of air drawn in and emitted at every respiration must differ considerably with the size of the man and the capacity of his lungs.

Dr. Menzies found that a man draws in at a medium 40 cubic inches of air at every inspiration. Dr. Goodwin has concluded from his experiments, that, after a complete expiration, the mean quantity of air which remains in the lungs amounts to 109 cubic inches; and Menzies has endeavoured to prove that after an ordinary respiration there remains 170. Mr. Davy has concluded that his lungs after a forced expiration still retain 41 cubic inches of air; after a natural expiration they contain 118 cubic inches.

After a natural inspiration -	135
After a forced inspiration -	254

By a full forced expiration, after a forced inspiration he threw out - - - 190 cubic inches.

After a natural inspiration -	78.5
After a natural expiration -	67.5

Dr. Menzies' estimate of an ordinary inspiration seems to approach nearest the average; but Dr. Bostock has shewn that his estimate of the capacity of the lungs is too low. Perhaps we shall not err very much if we suppose, with him, that the ordinary quantity of air contained in the lungs is 280 cubic inches; and that 40 inches, or $\frac{1}{7}$ of the whole is drawn in and thrown out at every ordinary respiration. This, supposing 20 respirations in a minute, will make the quantity of air drawn in and thrown out of the lungs every minute amount to 800 inches; to 48,000 inches in the hour, and to 1,152,000 inches in 24 hours, which amounts to rather more than 52½ lbs. avoirdupois.

Let us now endeavour to trace the changes produced by respiration. These are of two kinds, namely: I. The changes produced upon the air respired; II. Changes upon the blood exposed to this air. Each of these naturally claims our attention.

I. For our knowledge of the change produced upon the air by respiration we are chiefly indebted to Priestley, Cigna, Menzies, Lavoisier, Seguin, and Mr. Davy. These changes are the following: 1. Part of the oxygen of the air respired disappears; 2. Carbonic acid gass is found in its place; 3. It is loaded with water in the state of vapour.

1. A considerable number of experiments have been made to determine the change of bulk which air undergoes by being respired. According to Davy, by a single inspiration and expiration, it is diminished from $\frac{1}{70}$th to $\frac{1}{100}$th part of its bulk. If with Dr. Bostock, we take $\frac{1}{90}$th as the average diminution, and 40 inches as the quantity of air drawn into the lungs at each inspiration; then it will follow that half a cubic inch of the air disappears each time we respire. This in a day would amount to 14,400 cubic inches, which is rather more than eight cubic feet. When air is breathed the animal can support it no longer, the diminution which it undergoes is variously stated: Mr. Davy found it to amount to $\frac{1}{18}$th of the whole air; Lavoisier and Goodwin to $\frac{1}{20}$th; and Crawford, on the other hand, found no diminution at all. Their numbers vary so much, from each other, and from the estimate of a single respiration, that it is impossible to avoid concluding the diminution to be different at different times. I was induced, says Dr. Thomson, by a letter from Mr. Dalton in the summer of 1806, to make some experiments on the subject. In some cases I could perceive no diminution at all; in others it was perceptible. It was greatest when the animal was taken out repeatedly during the experiment, or when air was employed which was purer than that of the atmosphere. I am disposed to consider this diminution as accidental, and owing to some absorption of air altogether independant of respiration, and exceedingly various in different circumstances.

2. When the air drawn into the lungs is thrown out again, it is found deprived of a portion of its oxygen. Various experiments have been made to ascertain how this principle is lost by respiration in a given time; but they by no means correspond with one another. Indeed it is extremely probable, if not absolutely certain, that the degree of effect which the same animal produces upon the air respired differs materially at different times, and in consequence of different circumstances. Nothing, therefore, beyond an approximation can be expected from our experiments on this function. Dr. Menzies was the first who attempted to ascertain the quantity of oxygen consumed by a man in a day. According to him, 36 inches are consumed in a minute, and of course 51,840 inches in 24 hours. This estimate exceeds that obtained by Lavoisier and Davy from their experiments. Lavoisier and Seguin estimate the quantity of oxygen consumed by a man in 24 hours at 46,037 cubic inches, and this nearly coincides with the result which Lavoisier obtained from his last experiments, in which he was occupied when he was dragged to the place of execution. With this also the experiments of Davy coincide very well. He calculates that 31,6 inches of oxygen are consumed in a minute, which, in 24 hours, makes 45,504 inches. This coincidence would dispose us to embrace this result as affording a near approximation to the truth. We may conclude, then, that in a day a man consumes rather more than 25 cubic feet of oxygen. Now, since the oxygen amounts only to about one-fifth of the atmosphere, it follows that in a day a man destroys, or renders unfit for supporting combustion or respiration, no less than 125 cubic feet of air.

3. The air which is thrown out of the lungs contains in it a quantity of carbonic acid which did not exist in it previous to its being used for respiration. Dr. Menzies conceived that the bulk of this gass is precisely equivalent to that of the oxygen consumed. This also was the result of the experiments of Dr. Crawford. Lavoisier, in

his experiments on the Guinea pig, found it somewhat less. In his first experiment, he found the oxygen consumed, to the carbonic acid formed, as 20 to 16,5; in his second, as 20 to 173. In his experiments on Seguin, in 1789, the oxygen consumed was to the bulk of carbonic acid formed, nearly as 20 to 16,6; but in those that were made afterwards the proportion of carbonic acid is diminished by nearly one half. In Mr. Davy's experiments, the bulk of carbonic acid formed corresponded very nearly with that of the oxygen consumed, so that in this respect they coincided with those of Crawford and Menzies. I was informed by Mr. Dalton, observes Dr. Thomson, in the summer of 1806, that he had satisfied himself, by a variety of experiments, that the bulk of carbonic acid gass formed was exactly to that of the oxygen gass consumed. On repeating the experiment with that particular view, I found that in some cases this took place very nearly; but upon the whole the bulk of oxygen which disappeared was somewhat greater than that of the carbonic acid formed; but the difference varied considerably, and kept pace with the diminution of the bulk of air by respiration. Hence I consider it as owing to the abstraction of a part of the air by some other way than respiration. If this abstraction be allowed for, I have no doubt, from my own experiments, that the bulk of the carbonic acid formed by respiration is precisely equal to that of the oxygen which has disappeared. The absolute quantity it is difficult to state, as it depends upon a variety of circumstances. I am disposed to consider it, at an average, as approaching to 40,000 cubic inches in 24 hours, though probably somewhat under that quantity. Now, this quantity of carbonic acid contains little less than three quarters of a pound avoirdupois of carbon.

4. Dr. Priestley concluded from his experiments that not only the oxygen, but the azote also, of the air respired was diminished. This opinion was still farther confirmed by Davy, who found the consumption of azote to amount to about $\frac{1}{4}$th of that of the oxygen. Dr. Henderson has lately made experiments with the same result, though the proportion of azote absorbed was rather less. Upon repeating these experiments, says the above writer, I found likewise the loss of azote, but it was extremely inconstant, sometimes being scarcely perceptible, and at other times considerable. It keeps pace with the diminution of the bulk of the air respired, and with the difference between the bulk of the oxygen consumed and the carbonic acid formed. Hence I am disposed to ascribe all these differences to the same cause. I conceive that a portion of the air respired disappears without undergoing any change, and that this portion occasions the diminution of the azote, and the difference between the bulk of the carbonic acid formed and the oxygen consumed. What comes of this portion of air it is difficult to say; but I think it conceivable that the disappearing of such a portion may be confined to the unnatural circumstances occasioned by the experiment; that the difficulty of throwing out the air from the lungs in these circumstances may be such as to induce absorbents to act, and remove a portion, which in the ordinary situation of the lungs would have been thrown out by expiration.

5. It is not so easy to determine the portion of water emitted from the lungs mixed with the air expired, as it is that of the carbonic acid. According to the experiments of Dr. Hales, it amounts in a day to 20,4 oz.; but his method was not susceptible of great accuracy. Mr. Lavoisier, on the other hand, estimates it rather higher; but the proportion seems rather to have been the result of calculation than of any direct measurement. The result of a few trials which I made during the summer of 1806 gave me very nearly 19 ounces per day as the quantity emitted from my own lungs; but I do not lay much stress upon the results, as they were not sufficiently varied to give a fair average; but I think it worth while to mention the method I followed, on account of its simplicity. I filled a glass with water, and then by breathing on it, and gradually raising its temperature till the vapour of the breath just ceased to be condensed, I ascertained the force of the vapour contained in the air respired from Mr. Dalton's table. Then, ascertaining the force of the vapour in the atmosphere at the time, and substracting it from the force of the vapour in the breath, I obtained the force of the vapour actually emitted from the lungs. Supposing 40 inches of air to be drawn in at each inspiration, it was easy to calculate from Dalton's table the weight of the vapour which it contained when emitted.

II. Let us now endeavour to ascertain the changes produced on the blood by respiration. The whole of the blood is propelled from the heart to the lungs, and circulates through the vessels of that organ; and during that circulation it is exposed to the influence of the air which the animal is constantly drawing into the lungs. Now certain changes are produced upon it by this action, which have been partly traced by the experiments of Priestley, Cigna, Foureroy, Hassenfratz, Beddoes, Watt, and above all by those of Mr. Davy. These changes, as far as we are acquainted with them, are the following: 1. It acquires a florid red colour, and the chyle disappears; 2. It loses a portion of carbon; 3. It emits water.

It has been long known that the blood which flows in the veins is of a dark reddish purple colour. Lower observed that the colour of the venous blood was converted into that of arterial during its passage through the lungs.

No chyle can be distinguished by its white colour in the blood after it has passed through the lungs. The changes, then, which take place upon the appearance of the blood are two: 1. It acquires a florid red colour. 2. The chyle totally disappears. Lower himself knew that the change was produced by the air, and Mayow attempted to prove that it was by absorbing part of the air. But it was not till Dr. Priestley discovered that venous blood acquires a scarlet colour when put in contact with oxygen gass, and arterial blood a dark red colour when put in contact with hydrogen gass, or which is the same thing, that oxygen gass instantly gives venous blood the colour of arterial; and hydrogen, on the contrary, gives arterial blood the colour of venous blood—it was not till then that philosophers began to attempt any thing like an explanation of the phenomena of respiration.

The blood is a fluid of so complex a nature, that it is not easy to ascertain the changes produced in it by exposure to different gasses out of the body; and even if that could be done, we have no method of proving that the effect of those gasseous bodies upon coagulated blood are the same as they would be on the blood in its natural state, circulating in the vessels of a living animal.

The facts which have been ascertained are the following: 1st, It appears from the experiments of Priestley, Girtanner, and Hassenfratz, that when venous blood is exposed to oxygen gass con-

fined over it, the blood instantly assumes a scarlet colour. Mr. Davy could not perceive any sensible diminution of the bulk of the gass.

2d, The same change of colour takes place when blood is exposed to common air. In this case a quantity of carbonic acid gass is formed, and a quantity of oxygen gass, exactly equal to it in bulk, disappears; making allowance for the small quantity of carbonic acid, which we may suppose to be absorbed by the blood itself.

3d, Venous blood exposed to the action of azotic gass continues unaltered in colour, neither does any perceptible diminution of the gass ensue.

4th, Venous blood exposed to the action of nitrous gass, becomes of a deep purple, and about ¼th of the gass is absorbed.

5th, Venous blood exposed to nitrous oxyd becomes of a brighter purple, especially on the surface, and a considerable portion of the gass is absorbed.

6th, Venous blood exposed to carbonic acid gass becomes of a brownish red colour, much darker than usual, and the gass is slightly diminished in bulk.

7th, Carbureted hydrogen gass gives venous blood a fine red colour, a shade darker than oxygen gass does, was at first observed by Dr. Beddoes, and at the same time a small portion of the gass is absorbed. This gass has the property of preventing, or at least greatly retarding, the putrefaction of blood, as first observed by Mr. Watt.

8th, When arterial blood is put in contact with azotic gass, or carbonic acid gass, it gradually assumes the dark colour of venous blood, as Dr. Priestley found. The same philosopher also observed, that arterial blood acquired the colour of venous blood when placed in vacuo. Consequently this alteration of colour is owing to some change which takes place in the blood itself independent of any external agent. The arterial blood becomes much more rapidly and deeply dark coloured when it is left in contact with hydrogen gass placed above it. We must suppose therefore that the presence of this gass accelerates and increases the change, which would have taken place upon the blood without any external agent.

9th, If arterial blood be left in contact with oxygen gass, it gradually assumes the same dark colour which it would have acquired in vacuo, or in contact with hydrogen; and after this change oxygen can no longer restore its scarlet colour. Therefore it is only upon a part of the blood that oxygen acts; and after this part has undergone the change which occasions the dark colour, the blood loses the power of being affected byoxygen.

10th, Mr. Hassenfratz poured into venous blood a quantity of oxymuriatic acid; the blood was instantly decomposed, and assumed a deep and almost black colour. When he poured common muriatic acid into blood, the colour was not altered. Now oxymuriatic has the property of giving out its oxygen readily; consequently the black colour was owing to the instant combination of a part of the blood with oxygen.

Dr. Priestley, the first of the modern chemists who turned his attention to respiration, concluded from some of his earliest experiments, that the blood as it passed through the lungs gave out phlogiston to the air, which was expired loaded with substance; and of course that the purpose of respiration was to free the blood from phlogiston. Lavoisier soon after ascertained with more precision the changes which the air undergoes during respiration; and he formed a theory in order to explain that function, assuming as its basis that all the changes on the air inspired are produced in the lungs, and of course that all the new substances expired are formed in the lungs. According to him the blood absorbs no air in the lungs; but gives out hydrogen and carbon, which, combining with the oxygen of the air inspired, form water and carbonic acid. This theory was adopted by La Place, Crawford, Gren, and Girtanner, with a small variation. Indeed it does not differ, except in detail, from the original hypothesis of Dr. Priestley, that the use of respiration is to rid the blood of phlogiston; for if we substitute carbon and hydrogen for phlogiston, the two theories precisely agree. Mr. Lavoisier attempted not to prove its truth; he only tried to shew that the oxygen absorbed corresponds exactly with the quantity of oxygen contained in the carbonic acid and the water emitted. A different theory was afterwards proposed by Mr. De La Grange. According to this philosopher, the ogygen gass which disappears combines with the blood as it passes through the lungs; and at the instant of this combination there is set free from the blood a quantity of carbonic acid gass and water, which are thrown out along with the air expired. This theory was adopted and illustrated by Mr. Hassenfratz, and was embraced by Dr. Thomson in the last edition of his work, modified a little by the experiments of Davy. A letter which he received from Mr. Dalton in the summer of 1806, combating this theory, and defending that of Crawford, induced him to examine it more narrowly, and the result of a set of experiments which he immediately undertook, convinced him that Mr. Dalton's objections were well founded. The carbonic acid formed, he considered as exactly equal to the bulk of the oxygen which disappears. Hence this oxygen must be changed into carbonic acid in the lungs; for oxygen, when changed into carbonic acid, does not sensibly alter its bulk.

The blood then must emit carbon in the lungs to the extent of about ⅛ths of a pound in the day. This Dr. Thomson conceives is all that happens in the lungs. The watery vapour, indeed, is doubtless secreted from the blood to mix with the air inspired; but probably the secretion takes place in appropriate organs. By the loss of carbon the venous blood is changed into arterial. The very same thing happens when venous blood is presented to the air. The change of chyle into blood, he presumes, takes place in the blood vessels. Indeed the blood is a liquid which is constantly running through a suite of changes. Hence it is kept of a similar nature only by the constant influx of new matter, which is as constantly manufactured in the blood. It appears from the most accurate observations hitherto made, that neither chyle nor lymph contain fibrin, which forms a very conspicuous part of the blood. This fibrin is employed to supply the waste of muscles, the most active parts of the body, and therefore in all probability requiring the most frequent supply. Nor can it be doubted that it is employed for other useful purposes. The quantity of fibrin in the blood, then, must be constantly diminishing, and therefore new fibrin must be constantly formed. But the only substances out of which it can be formed are the chyle and lymph, neither of which contain it. There must therefore be a continual decomposition of the chyle and lymph going on in the blood-vessels, and a continual new formation of fibrin. Other substances also may be formed; but we are certain that this must be formed there, because it does not

exist previously. Now one great end of respiration must undoubtedly be to assist this decomposition of chyle and complete formation of blood.

It follows from the experiments of Fourcroy, formerly enumerated, that fibrin contains more azote and less carbon than any of the other ingredients of the blood, and consequently also than any of the ingredients of the chyle. In what manner the chyle, or part of it, is converted into fibrin, it is impossible to say: we are not sufficiently acquainted with the subject to be able to explain the process. But we can see, at least, that carbon must be abstracted from that part of the chyle which is to be converted into fibrin. Hence as the process of blood-making advances, there must be a greater and greater redundancy of carbon in the liquid. Unless this redundancy were removed, the process could not go on, and probably the whole would run into putrefaction. We may conclude then, that one great use of respiration is to abstract this carbon, by forming with it carbonic acid. How this is performed, indeed, it is impossible at present to explain; but the fact is undoubted.

But the abstraction of carbon is not the only advantage gained by respiration: the temperature of all animals depends upon it. It has been long known, that those animals which do not breathe have a temperature but very little superior to the medium in which they live. This is the case with fishes and many insects. Man, on the contrary, and quadrupeds which breathe have a temperature considerably higher than the atmosphere: that of man is 98°. Birds, who breathe in proportion a still greater quantity of air than man, have a temperature equal to 103° or 104°. It has been proved that the temperature of all animals is proportional to the quantity of air which they breathe in a given time. These facts are sufficient to demonstrate that the heat of animals depends upon respiration. But it was not till Dr. Black's doctrine of latent heat became known to the world, that any explanation of the cause of the temperature of breathing animals was attempted. That illustrious philosopher, whose discoveries form the basis upon which all the scientific part of chemistry has been reared, saw at once the light which his doctrine of latent heat threw upon this part of physiology, and he applied it very early to explain the temperature of animals.

According to him, part of the latent heat of the air inspired becomes sensible, and of course the temperature of the lungs, and the blood that passes through them, must be raised; and the blood thus heated, communicates its heat to the whole body. This opinion was ingenious, but it was liable to an unanswerable objection: for if it were true, the temperature of the body ought to be greatest in the lungs, and to diminish gradually as the distance from the lungs increases; which is not true. The theory in consequence was abandoned, even by Dr. Black himself; at least he made no attempt to support it.

Dr. Crawford, who considered all the changes operated by respiration as taking place in the lungs, accounted for the origin of animal heat almost precisely in the same manner with Dr. Black. According to him, the oxygen gass of the air combines in the lungs with carbon emitted by the blood. During this combination, the oxygen gives out a great quantity of caloric, with which it had been combined; and this caloric is not only sufficient to support the temperature of the body, but also to carry off the new-formed water in the state of vapour, and to raise considerably the temperature of the air inspired. According to this philosopher, then, the whole of the calorie which supports the temperature of the body is evolved in the lungs. His theory accordingly was liable to the same objection with Dr. Black's; but Dr. Crawford obviated it in the following manner: he found that the specific caloric of arterial blood was 1.0300, while that of venous blood was only 0.8928. Hence he concluded, that the instant venous blood is changed into arterial blood its specific caloric increases; consequently it requires an additional quantity of caloric to keep its temperature as high as it had been while venous blood. This is so great, that the whole new caloric evolved is employed; therefore the temperature of the lungs must necessarily remain the same as the rest of the body. During the circulation arterial blood is gradually converted into venous; consequently its specific caloric diminishes, and it must give out heat. This is the reason that the temperature of the extreme parts of the body does not diminish. This theory is extremely ingenious, and accounts for the whole phænomena in a much more satisfactory manner than any other which has been proposed.

To RESPI'RE. *v. n.* (*respiro*, Latin.) 1. To breathe (*Dryden*). 2. To catch breath (*Milton*). 3. To rest; to take rest from toil (*Pope*).

RESPI'TE. *s.* (*respit*, French.) 1. Reprieve; suspension of a capital sentence (*Prior*). 2. Pause; interval (*Raleigh*).

To RESPI'TE. *v. a.* (from the noun.) 1. To relieve by a pause (*Milton*). 2. (*respiter*, old French.) To suspend; to delay (*Clarendon*).

RESPLE'NDENCE. RESPLE'NDENCY. *s.* (from *resplendent.*) Lustre; brightness; splendour (*Boyle*).

RESPLE'NDENT. *a.* (*resplendens*, Lat.) Bright; shining; having a beautiful lustre (*Newton*).

RESPLE'NDENTLY. *ad.* (from *resplendent.*) With lustre; brightly; splendidly.

To RESPO'ND. *v. n.* (*respondeo*, Latin.) 1. To answer. 2. To correspond; to suit (*Broome*).

RESPO'NDENT. *s.* (*respondens*, Latin.) 1. An answer in a suit (*Ayliffe*). 2. One whose province, in a set disputation, is to refute objections (*Watts*).

RESPO'NSE. *s.* (*responsum*, Latin.) 1. An answer (*Hammond*). 2. (*respons*, French.) Answer made by the congregation in public worship (*Addison*). 3. Reply to an objection in a formal disputation (*Watts*).

RESPO'NSIBLE. *a.* (from *responsus*, Lat.) 1. Answerable; accountable (*Hammond*). 2. Capable of discharging an obligation (*Locke*).

RESPO'NSIBLENESS. *s.* State of being obliged or qualified to answer.

RESPO'NSION. *s.* (*responsio*, Latin.) The act of answering.

RESPO'NSIVE. *a.* (*responsif*, French.) 1. Answering; making answer (*Ayliffe*). 2. Correspondent; suited to something else (*Fenton*).

RESPO'NSORY. *a.* (*responsorius*, Latin.) Containing answer.

RESSIUS (Rutger), a learned professor of

Greek at Louvaine, of whom Erasmus gives a high character. He published among other works the aphorisms of Hippocrates, and died in 1545.

RESSORT, a French word, sometimes used by English authors to signify the jurisdiction of a court, and particularly one from which there is no appeal. Thus it is said that the house of lords judge *en dernier ressort*, or in the last ressort.

REST. *s.* (nert, Saxon; *ruste*, Dutch.) 1. Sleep; repose (*Pope*). 2. The final sleep; the quietness of death (*Dryden*). 3. Stillness; cessation or absence of motion (*Bacon*). 4. Quiet; peace; cessation from disturbance (*Daniel*). 5. Cessation from bodily labour (*Job*). 6. Support; that on which any thing leans or rests (*Fairfax*). 7. Place of repose (*Milton*). 8. Final hope (*Clarendon*). 9. (*reste*, Fr.) Remainder; what remains (*Dryden*).

REST, in music. See MUSIC.

REST HARROW, in botany. See ONONIS.

REST. *a.* (*restes*, French.) Others; those not included in any proposition (*Stillingfleet*).

To REST. *v. n.* (from the noun.) 1. To sleep; to be asleep; to slumber (*Milton*). 2. To sleep the final sleep; to die (*Milton*). 3. To be at quiet; to be at peace; to be without disturbance (*Milton*). 4. To be without motion; to be still (*Milton*). 5. To be fixed in any state or opinion (*Dryden*). 6. To cease from labour (*Taylor*). 7. To be satisfied; to acquiesce (*Addison*). 8. To lean; to recline for support (*Waller*). 9. (*rester*, French.) To be left; to remain (*Bacon*).

To REST. *v. a.* 1. To lay to rest (*Dryden*). 2. To place as on a support (*Waller*).

RESTA BOVIS. The rest harrow is so called because it hinders the plough; hence resta bovis. See ONONIS.

RESTA'GNANT. *a.* (*restagnans*, Latin.) Remaining without flow or motion (*Boyle*).

To RESTA'GNATE. *v. n.* (*re* and *stagnate*.) To stand without flow (*Wiseman*).

RESTAGNA'TION. *s.* (from *restagnate*.) The state of standing without flow, course, or motion.

RESTAURA'TION. *s.* (*restauro*, Latin.) The act of recovering to the former state.

To RESTE'M. *v. a.* (*re* and *stem*.) To force back against the current (*Shakspeare*).

RE'STFUL. *a.* (*rest* and *full*.) Quiet; being at rest (*Shakspeare*).

RE'STIFF. *a.* (*restif*, Fr. *restivo*, Ital.) 1. Unwilling to stir; resolute against going forward; obstinate; stubborn (*Dryden*). 2. Being at rest; being less in motion: not used.

RE'STIFNESS. *s.* (from *restiff*.) Obstinate reluctance (*K. Charles*).

RESTI'NCTION. *s.* (*restinctus*, Latin.) The act of distinguishing.

RESTIO, in botany, a genus of the class diœcia, order triandria. Calyx three-leaved, two of them boat-shaped; corol of three lanceolate leaves, one of them broader. Female: germ three-sided; style one, rarely two or three; stigmas from one to three, feathered. Twenty-eight species, all natives of the Cape, several resembling rushes, and used in making brooms, thatching outhouses, &c.

RESTITU'TION. *s.* (*restitutio*, Latin.) 1. The act of restoring what is lost or taken away (*Arbuthnot*). 2. The act of recovering its former state or posture (*Grew*).

RE'STLESLY. *ad.* (from *restless*.) Without rest; unquietly (*South*).

RE'STLESNESS. *s.* (from *restless*.) 1. Want of sleep (*Harvey*). 2. Want of rest; unquietness (*Herbert*). 3. Motion; agitation (*Boyle*).

RE'STLESS. *a.* (from *rest*.) 1. Being without sleep (*Dryden*). 2. Unquiet; without peace (*Prior*). 3. Unconstant; unsettled (*Dryden*). 4. Not still; in continued motion (*Milton*).

RESTO'RABLE. *a.* (from *restore*.) What may be restored (*Swift*).

RESTORA'TION. *s.* (from *restore; restauration*, French.) 1. The act of replacing in a former state: properly *restauration* (*Dryden*). 2. Recovery (*Rogers*).

RESTO'RATIVE. *a.* (from *restore*.) That has the power to recruit life (*Milton*).

RESTO'RATIVE. *s.* (from *restore*.) A medicine that has the power of recruiting life (*South*).

To RESTO'RE. *v. a.* (*restaurer*, Fr.) 1. To give back what has been lost or taken away (*Dryden*). 2. To bring back (*Dryden*). 3. To retrieve; to bring back from degeneration, declension, or ruin, to its former state (*Prior*). 4. To recover passages in books from corruption.

RESTO'RER. *s.* (from *restore*.) One that restores.

To RESTRAI'N. *v. a.* (*restreindre*, French.) 1. To withhold; to keep in (*Shakspeare*). 2. To repress; to keep in awe (*Locke*). 3. To suppress; to hinder; to repress (*Milt.*). 4. To abridge (*Clarendon*). 5. To hold in (*Shaks.*). 6. To limit; to confine (*South*).

RESTRAI'NABLE. *a.* (from *restrain*.) Capable to be restrained (*Brown*).

RESTRAI'NEDLY. *ad.* (from *restrained*.) With restraint; without latitude (*Hammond*).

RESTRAI'NER. *s.* (from *restrain*.) One that restrains; one that withholds (*Brown*).

RESTRAI'NT. *s.* (from *restrain; restreint*, French). 1. Abridgment of liberty (*Shaks.*) 2. Prohibition (*Milton*). 3. Limitation; restriction (*Brown*). 4. Repression; hinderance of will; act of withholding; state of being withheld (*South*).

To RESTRI'CT. *v. a.* (*restrictus*, Latin.) To limit; to confine (*Arbuthnot*).

RESTRI'CTION. *s.* (*restriction*, French.) Confinement; limitation (*Temple*).

RESTRI'CTIVE. *a.* (from *restrict*.) 1. Expressing limitation (*Stillingfleet*). 2. (*restrictif*, French.) Styptic; astringent (*Wiseman*).

RESTRI'CTIVELY. *ad.* (from *restrictive*.) With limitation (*Gov. of the Tongue*).

To RESTRI'NGE. *v. a.* (*restringo*, Latin.) To confine; to contract; to astringe.

RESTRI'NGENT. *s.* (*restringens*, Lat.) That which hath the power of contracting; styptic (*Harvey*).

RE'STY. *a.* (*restif*, French.) Obstinate in standing still; restiff (*Swift*).

To RESUBLI'ME. *v. a.* (*re* and *sublime*.) To sublime another time (*Newton*).

To RESU'LT. *v. a.* (*resulto*, Latin.) 1. To fly back (*Pope*). 2. (*resulter*, Fr.) To rise as a consequence; to be produced as the effect of causes jointly concurring (*Bacon*). 3. To arise as a conclusion from premises.

RESUL'T. *s.* (from the verb.) 1. Resilience; act of flying back (*Bacon*). 2. Consequence; effect produced by the concurrence of co-operating causes (*K. Charles*). 3. Inference from premises (*South*). 4. Resolve; decision. Improper (*Swift*).

RESU'LTANCE. *s.* (*resultance*, French.) The act of resulting.

RESU'MABLE. *a.* (from *resume*.) What may be taken back (*Hale*).

To RESU'ME. *v. a.* (*resumo*, Latin.) 1. To take back what has been given (*Waller*). 2. To take back what has been taken away (*Shaks.*). 3. To take again (*Dryden*). 4. To begin again what was broken off: as, *to* resume *a discourse*.

RESU'MPTION. *s.* (*resomption*, French; *resumptus*, Lat.) The act of resuming (*Denham*).

RESU'MPTIVE. *a.* (*resumptus*, Lat.) Taking back.

RESUPINATE COROL, in botany. Cum labium superius terram, inferius cœlum spectat. When the upper lip faces the ground, and the lower lip the sky. Or, when that which is usually the upper lip (in a labiate corol) becomes the lower; and the contrary: so that the flower is, as it were, turned upside down; or, in vulgar language, topsy-turvy. This is exemplified in scrophularia, ocymum, ajuga orientalis, the European violets, and some species of satyrium.

RESUPINATE LEAF, in botany. Pagina superiore inferiore, et contra inferiore superiore facta. A leaf is said to be resupinate, or turned upside down, when that which is commonly the upper surface becomes the lower; and the contrary.

RESUPINA'TION. *s.* (*resupino*, Latin.) The act of lying on the back.

To RESURVE'Y. *v. a.* (*re* and *survey*.) To review; to survey again (*Shakspeare*).

RESURRE'CTION. *s.* (*resurrection*, Fr. *resurrectum*, Latin.) Revival from the dead; return from the grave (*Watts*).

RESURRECTION. (*resurrectio*.) Resuscitation, the act of returning to a new, or second life, after having been dead.

The great argument for the truth of Christianity, and that urged with the most force and conviction for the same, is drawn from the resurrection of our Saviour. The circumstances thereof are such as almost admit of a demonstration, which has accordingly been attempted on the strict principles of geometricians. Without going so far as this, however, it may be safely affirmed, that no fact, equally remote, is confirmed by such variety and such force of evidence. On this great fact hangs the correspondent doctrine, that dead saints shall be raised in the same body at the last day. Many philosophical objections have been urged against this latter doctrine; for a recapitulation of which, and an attempt at refuting the principal, see Gregory's Letters on the Christian Religion, vol. ii. The fact of Christ's resurrection is established among the *evidences* of christianity in the first vol. of that work.

To RESU'SCITATE. *v. a.* (*resuscito*, Lat.) To stir up anew; to revive (*Bacon*).

RESUSCITA'TION. *s.* (from *resuscitate*.) The act of stirring up anew; the act of reviving, or state of being revived (*Pope*).

RESUSCITATION. The restoring of persons, apparently dead, to life. Under this head, strictly speaking, is considered the restoring of those who faint, or have breathed noxious and irrespirable air; yet it is chiefly confined to the restoring of those who are apparently dead from being immersed in a fluid, or by hanging. Dr. Curry, of Guy's hospital, has written a very valuable book on this subject; and such is its importance, that we have thought proper to insert the following account:

"From considering," he observes, "that a drowned person is surrounded with water instead of air, and that in this situation he makes strong and repeated efforts to breathe, we should expect that the water would enter and completely fill the lungs. This opinion, indeed, was once very general, and it still continues to prevail among the common people. Experience, however, has shewn, that unless the body lie so long in the water as to have its living principle entirely destroyed, the quantity of fluid present in the lungs is inconsiderable; and it would seem that some of this is the natural moisture of the part accumulated; for, upon drowning kittens, puppies, &c. in ink, or other coloured liquors, and afterwards examining the lungs, it is found that very little of the coloured liquor has gained admittance to them.—To explain the reason why the lungs of drowned animals are so free from water, it is necessary to observe, that the muscles which form the opening into the wind-pipe are exquisitely sensible, and contract violently upon the least irritation, as we frequently experience when any part of the food or drink happens to touch them. In the efforts made by a drowning person, or animal, to draw in air, the water rushes into the mouth and throat, and is applied to these muscles, which immediately contract in such a manner as to shut up the passage into the lungs. This contracted state continues as long as the muscles retain the principle of life, upon which the power of muscular contraction depends; when that is gone, they become relaxed, and the water enters the wind-pipe, and completely fills it. On dissecting the body of a recently drowned animal, no particular fulness of the vessels within the skull, nor any disease of the brain or its membranes, are visible. The lungs also are

sound, and the branches of the wind-pipe generally contain more or less of a frothy matter, consisting chiefly of air, mixed with a small quantity of colourless fluid. The right cavity of the heart, and the trunks of the large internal veins which open into it, and also the trunk and larger branches of the artery which carries the blood from this cavity through the lungs, are all distended with dark-coloured blood, approaching almost to blackness. The left cavity of the heart, on the contrary, is nearly or entirely empty, as are likewise the large veins of the lungs which supply it with blood, and the trunk and principal branches of the great artery which conveys the blood from hence to the various parts of the body. The external blood-vessels are empty; and the fleshy parts are as pale as if the animal had been bled to death. When a body has lain in the water for some time, other appearances will also be observable; such as, the skin livid, the eyes blood-shot, and the countenance bloated and swoln; but these appearances, though certainly unfavourable, do not absolutely prove that life is irrecoverably gone. It is now known, that in the case of drowning, no injury is done to any of the parts essential to life; but that the right cavity of the heart, together with the veins and arteries leading to and from that cavity, are turgid with blood, whilst every other part is almost drained of this fluid. The practice of holding up the bodies of drowned persons by the heels, or rolling them over a cask, is unnecessary; the lungs not being filled with any thing that can be evacuated in this way. Therefore such a practice is highly dangerous, as the violence attending it may readily burst some of those vessels which are already overcharged with blood, and thus convert what was only suspended animation into absolute and permanent death. The operation of inflating the lungs is a perfectly safe and much more effectual method of removing any frothy matter they may contain; and whilst it promotes the passage of the blood through them, also renders it capable of stimulating the left cavity of the heart, and exciting it to contraction. As soon as the body is taken out of the water, it should be stripped of any clothes it may have on, and be immediately well dried. It should then be wrapped in dry warm blankets, or in the spare clothes taken from some of the by-standers, and be removed as quickly as possible to the nearest house that can be got convenient for the purpose. The fittest will be one that has a tolerably large apartment, in which a fire is ready, or can be made. The body may be carried in men's arms, or laid upon a door; or, in case the house be at a distance from the place, if a cart can be procured, let the body be placed in it, on one side, upon some straw, with the head and upper parts somewhat raised; and in this position a brisk motion will do no harm. Whatever be the mode of conveyance adopted, particular care should be taken that the head be neither suffered to hang backwards, nor to bend down with the chin upon the breast. When arrived at the house, lay the body on a mattress, or a double blanket, spread upon a low table, or upon a door supported by stools; the head and chest being elevated by pillows. As the air of a room is very soon rendered impure by a number of people breathing in it, for this reason, as well as to avoid the confusion and embarrassment attending a crowd, no more persons should be admitted into the apartment where the body is placed than are necessary to assist immediately in the recovery: in general, six will be found sufficient for this purpose, and these should be the most active and intelligent of the bystanders. It will be found most convenient to divide the assistants into two sets; one set being employed in restoring the heat of the body, while the other institutes an artificial breathing in the best manner they are able. Every skilful person should be provided with a flexible tube made of elastic gum, half a yard in length, to introduce into the wind-pipe, and also with a similar tube to which a syringe can be affixed, to be put into the œsophagus. Should these not be at hand, air should be thrown into the lungs in the best manner that can be suggested at the time. Should it still be found that the air does not pass readily into the lungs, immediate recourse must be had to another and more effectual method for attaining that object. As this method, however, requires address, and also some knowledge of the parts about the throat, we would recommend that when there is not a medical gentleman present, the mode already described be tried repeatedly before this be attempted. As a quantity of frothy matter occupying the branches of the wind-pipe and preventing the entrance of the air into the lungs, is generally the circumstance which renders this mode of inflation necessary, the mouth should be opened from time to time to remove this matter as it is discharged. While one set of the assistants are engaged in performing artificial respiration, the other should be employed in communicating heat to the body. The warm bath has been usually recommended for this purpose; but wrapping the body in blankets, or woollen cloths, strongly wrung out of warm water, and renewing them as they grow cool, besides being a speedier and more practicable method of imparting heat, has this great advantage, that it admits of the operation of inflating the lungs being carried on without interruption. Until a sufficient quantity of warm water can be got ready, other methods of restoring warmth may be employed; such as the application of dry warm blankets round the body and limbs; bags of warm grains or sand, bladders or bottles of hot water, or hot bricks applied to the hands, feet, and under the armpits, the bottles and bricks being covered with flannel: or the body may be placed before the fire, or in the sunshine if strong at the time, and be gently rubbed by the assistants with their warm hands, or with cloths heated at the fire, or by a warming-pan. The restoration of heat should always be gradual, and the warmth applied ought never to be greater than can be comfortably borne by the assistants. If the weather happen to be cold, and especially if

the body has been exposed to it for some time, heat should be applied in a very low degree at first: and if the weather be under the freezing point, and the body, when stripped, feel cold and nearly in the same condition with one that is frozen, it will be necessary at first to rub it well with snow, or wash it with cold water; the sudden application of heat in such cases having been found very pernicious. In a short time, however, warmth must be gradually applied. To assist in rousing the activity of the vital principle, it has been customary to apply various stimulating matters to different parts of the body. But as some of these applications are in themselves hurtful, and the others serviceable only according to the time and manner of their employment, it will be proper to consider them particularly. The application of all such matters in cases of apparent death, is founded upon the supposition that the skin still retains sensibility enough to be affected by them. It is well known, however, that even during life, the skin loses sensibility in proportion as it is deprived of heat, and does not recover it again until the natural degree of warmth be restored. Previous to the restoration of heat, therefore, to a drowned body, all stimulating applications are useless, and so far as they interfere with the other measures, are also prejudicial. The practice of rubbing the body with salt or spirits is now justly condemned. The salt quickly frets the skin, and has in some cases produced sores, which were very painful and difficult to heal after recovery. Spirits of all kinds evaporate fast, and thereby, instead of creating warmth, as they are expected to do, carry off a great deal of heat from the body. Spirit of hartshorn, or of sal volatile, are liable to the same objection as brandy or other distilled spirits, and are besides very distressing to the eyes of the assistants. When there is reason to think the skin has in any degree recovered its sensibility, let an assistant moisten his hand with spirit of hartshorn, or *eau de luce*, and hold it closely applied to one part: in this way evaporation is prevented, and the full stimulant effect of the application obtained. A liniment composed of equal parts of spirit of hartshorn and salad oil, well shaken together, would appear to be sufficiently stimulating for the purpose, and as it evaporates very slowly, will admit of being rubbed on without producing cold. The places to which such remedies are usually applied are, the wrists, ancles, temples, and the parts opposite the stomach and heart. The intestines, from their internal situation and peculiar constitution, retain their irritability longer than the other parts of the body, and accordingly, various means have been proposed for increasing the action of their fibres, in order to restore the activity of the whole system. Tobacco-smoke, injected by way of glyster, is what has been generally employed with this view, and the fumigator, or instrument for administering it, makes a part of the apparatus which is at present distributed by the different societies established for the recovery of drowned persons. Of late, however, the use of tobacco-smoke has been objected to, and upon very strong grounds; for when we consider that the same remedy is successfully employed with the very opposite intention, namely, that of lessening the power of contraction in the muscles, and occasioning the greatest relaxation consistent with life, it must be acknowledged to be a very doubtful, if not dangerous remedy, where the powers of life are already nearly exhausted. Instead of tobacco-smoke then, we would recommend a glyster, consisting of a pint or more of water, moderately warmed, with the addition of one or two table spoonsful of spirit of hartshorn, a heaped tea spoonful of strong mustard, or a table spoonful of essence of peppermint; in defect of one or other of these, half a gill or more of rum, brandy, or gin may be added, or the warm water given alone. This step, however, need not be taken, until artificial respiration has been begun; for it will answer but little purpose to stimulate the heart through the medium of the intestines, unless we, at the same time, supply the left cavity with blood fitted to act upon it; which we cannot do without first removing the collapsed state of the lungs, and promoting the passage of the blood through them by a regular inflation. As the stomach is a highly sensible part, and intimately connected with the heart and brain, the introduction of some moderately warm and stimulating liquor into it seems well calculated to rouse the dormant powers of life. This is very conveniently done by means of the syringe and flexible tube. The quantity of fluid thrown in ought not to exceed half a pint, and may be either warm negus, or water with the addition of one or other of the stimulating matters recommended above, using, however, only half the quantities mentioned there. As soon as the pulse or beating of the heart can be felt, the inside of the nostrils may be occasionally touched with a feather dipt in spirit of hartshorn, or sharp mustard; it being found by experience, that any irritation given to the nose has considerable influence in exciting the action of the muscles concerned in respiration. When the natural breathing commences, the flexible tube and canula should be withdrawn, and any farther inflation that may be necessary, performed by blowing into the nostril. Letting blood has been generally thought requisite in every case of suspended animation. The practice, however, does not appear to have been founded upon any rational principle at first, and it has been continued from the force of custom, rather than from any experience of its good effects. In the case of drowned persons there is not, as in those who suffer from hanging or apoplexy, any unusual fulness of the vessels of the brain; and the quantity of blood that can be drawn from the external veins will not sensibly diminish the accumulation of it in those near the heart. Besides, blood-letting, which always tends to lessen the action of the heart and arteries in the living body, cannot be supposed to have a directly opposite effect in cases of apparent death; on the contrary, if employed here, it will hazard the entire destruc-

tion of those feeble powers which yet remain, and to increase and support which all our endeavours should be directed. When the several measures recommended above have been steadily pursued for an hour or more, without any appearance of returning life, electricity should be tried; experience having shewn it to be one of the most powerful stimuli yet known, and capable of exciting contraction in the heart and other muscles of the body, after every other stimulus had ceased to produce the least effect. Moderate shocks are found to answer best, and these should, at intervals, be passed through the chest in different directions, in order, if possible, to rouse the heart to act. Shocks may likewise be sent through the limbs, and along the spine; but we are doubtful how far it is safe or useful to pass them through the brain, as some have recommended. The body may be conveniently insulated, by placing it on a door, supported by a number of quart bottles, whose sides are previously wiped with a towel, to remove any moisture they may have contracted. By experiments made on different animals, it is found that the blood passes through the lungs most readily when they are fully distended with air; consequently, that if the lungs of a drowned person are inflated, and kept in the expanded state whilst the electric shock is passed through the chest, the blood accumulated in the right cavity of the heart and its vessels will move forward without any resistance, should the heart be brought to contract upon it. As soon as the shock is given, let the lungs be emptied of the air they contain, and filled again with fresh air; then pass another shock, and repeat this until the heart is brought into action, or until it appear that all farther attempts are useless. In order more certainly to pass the shock through the heart, place the knob of one discharging rod above the collar-bone of the right side, and the knob of the other above the short ribs of the left: the position of the discharging rods, however, may be changed occasionally, so as to vary the direction of the shock. Two thick brass wires, each about eighteen inches long, passed through the two glass tubes, or wooden cases well varnished, and having at one end a knob, and at the other a ring to fasten the brass chain to, form very convenient discharging rods; and by means of them the shock may be administered without the risque of its being communicated to the assistants, or carried off by the skin being wet. When the patient is so far recovered as to be able to swallow, he should be put into a warm bed, with his head and shoulders somewhat raised by means of pillows. Plenty of warm wine-whey, ale-posset, or other light and moderately nourishing drink, should now be given, and gentle sweating promoted, by wrapping the feet and legs in flannels well wrung out of hot water. If the stomach and bowels feel distended and uneasy, a glyster, consisting of a pint of warm water, with a table spoonful of common salt, or an ounce or more of Glauber's or Epsom salt, dissolved in it, may be administered. The general practice, in this case, is to give an emetic; but considering that the powers of the machine are still very weak, the agitation of vomiting is certainly hazardous. The patient should on no account be left alone, until the senses are perfectly restored, and he be able to assist himself; several persons having relapsed and been lost, from want of proper attention to them, after the vital functions were, to all appearance, completely established. Either from the distention which the arteries of the lungs have suffered, or from the sudden change from great coldness to considerable warmth, it now and then happens, that the patient is attacked, soon after recovery, with inflammation of some of the parts within the chest. This occurrence is pointed out by pain in the breast or side, increased on inspiration, and accompanied with frequent, and full or hard pulse, and sometimes with cough. Here the taking away some blood from the arm, or the application of cupping glasses, leeches, or a blister, over the seat of the pain will be very proper; but the necessity for these measures, as well as the time for putting them in practice, should be left to the judgment and discretion of a medical person. Dull pain in the head, lasting sometimes for two or three days, is by no means an unfrequent complaint in those who are recovered from this and from the other states of suspended animation; and here also a moderate bleeding from the neck, either with the lancet or with cupping-glasses, may prove serviceable.

In hanging, the external veins of the neck are compressed by the cord, and the return of the blood from the head thereby impeded, from the moment that suspension takes place; but as the heart continues to act for a few seconds after the windpipe is closed, the blood which is sent to the head during this interval is necessarily accumulated there. Hence it is, that in hanged persons the face is greatly swoln, and of a dark red or purple colour: the eyes are commonly suffused with blood, enlarged, and prominent. On dissection, the blood-vessels of the brain are found considerably distended; but, in general, no further marks of disease appear within the scull. The lungs are found generally quite collapsed, and free from frothy matter. The heart and the large blood-vessels adjoining to it exhibit the same appearances as in the bodies of drowned persons. From the great accumulation of blood in the vessels of the head, many have been of opinion, that hanging kills chiefly by inducing apoplexy; but the following experiment made at Edinburgh several years ago, by an eminent medical professor there, clearly proves, that in hanging, as well as in drowning, the exclusion of air from the lungs is the immediate cause of death. A dog was suspended by the neck with a cord, an opening having been previously made in the wind-pipe, below the place where the cord was applied, so as to admit air into the lungs. In this state he was allowed to hang for three quarters of an hour, during which time the circulation and breathing went on. He was then cut down, without appearing to have suffered much from the experiment. The

The cord was now shifted below the opening into the wind-pipe, so as to prevent the ingress of air to the lungs; and the animal being again suspended, he was completely dead in a few minutes. Upon the whole then, it appears, that the same measures recommended for drowned persons, are also necessary here; with this addition, that opening the jugular veins, or applying cupping-glasses to the neck, will tend considerably to facilitate the restoration of life, by lessening the quantity of blood contained in the vessels of the head, and thereby taking off the pressure from the brain. Except in persons who are very full of blood, the quantity taken away need seldom exceed an ordinary tea cupful, which will in general be sufficient to unload the vessels of the head, without weakening the powers of life."

To RETAI'L. *v. a.* (*retailler*, Fr.) 1. To sell in small quantities, in consequence of selling at second hand (*Locke*). 2. To sell at second hand (*Pope*). 3. To sell in broken parts.

RETAI'L. *s.* (from the verb.) Sale by small quantities, or second hand (*Swift*).

RETAI'LER. *s.* (from *retail.*) One who sells by small quantities (*Hakewill*).

To RETAI'N. *v. a.* (*retineo*, Latin.) 1. To keep; not to lose (*Locke*). 2. To keep; not to lay aside (*Brown*). 3. To keep; not to dismiss (*Milton*). 4. To keep in pay; to hire (*Add.*).

To RETAI'N. *v. n.* 1. To belong to; to depend on (*Boyle*). 2. To keep; to continue: not used (*Donne*).

To RETAIN, in the manage, to hold in or preserve the male semen. This is said of mares that conceive, and *hold* after covering.

RETAI'NER. *s.* (from *retain.*) 1. An adherent; a dependant; a hanger-on (*Swift*). 2. In common law, *retainer* signifies a servant not menial nor familiar, that is not dwelling in his house; but only using or bearing his name or livery (*Cowell*). 3. The act of keeping dependants, or being in dependance (*Bacon*).

RETAINING-FEE, is the first fee given in any cause to a serjeant or counsellor at law, whereby to make him sure, that he shall not be on the contrary side.

To RETA'KE. *v. a.* (*re* and *take.*) To take again (*Clarendon*).

To RETA'LIATE. *v. a.* (*re* and *talio*, Latin.) To return by giving like for like; to repay; to requite (*Swift*).

RETALIA'TION. *s.* (from *retaliate.*) Requital; return of like for like (*Calamy*).

To RETA'RD. *v. a.* (*retardo*, Lat. *retarder*, French.) 1. To hinder; to obstruct in swiftness of course (*Denham*). 2. To delay; to put off (*Dryden*).

To RETA'RD. *v. n.* To stay back (*Brown*).

RETARDA'TION. *s.* (*retardation*, Fr.) Hinderance; the act of delaying (*Bacon*).

RETARDATION, in physics, the act of retarding, that is, of delaying the motion or progress of a body, or of diminishing its velocity.

The retardation of moving bodies arises from two great causes, the resistance of the medium, and the force of gravity.

The retardation from the resistance is often confounded with the resistance itself; because, with respect to the same moving body, they are in the same proportion.

But with respect to different bodies, the same resistance often generates different retardations. For if bodies of equal bulk, but different densities, be moved through the same fluid with equal velocity, the fluid will act equally on each; so that they will have equal resistances, but different retardations; and the retardations will be to each other, as the velocities which might be generated by the same forces in the bodies proposed; that is, they are inversely as the quantities of matter in the bodies, or inversely as the densities.

Suppose then bodies of equal density, but of unequal bulk, to move equally fast through the same fluid; then their resistances increase according to their superficies, that is as the squares of their diameters; but the quantities of matter are increased according to their mass or magnitude, that is as the cubes of their diameters: the resistances are the quantities of motion; the retardations are the celerities arising from them; and dividing the quantities of motion by the quantities of matter, we shall have the celerities; therefore the retardations are directly as the squares of the diameters, and inversely as the cubes of the diameters, that is inversely as the diameters themselves.

If the bodies be of equal magnitude and density, and moved through different fluids, with equal celerity, their retardations are as the densities of the fluids. And when equal bodies are carried through the same fluid with different velocities, the retardations are as the squares of the velocities.

So that, if s denote the superficies of a body, w its weight, d its diameter, v the velocity, and n the density of the fluid medium, and N that of the body; then, in similar bodies, the resistance is as nsv^2 or as nd^2v^2, and the retardation, or retarding force,

as $\frac{nsv^2}{w}$, or as $\frac{nd^2v^2}{\mathrm{N}d^3} = \frac{nv^2}{\mathrm{N}d}$.

The retardation from gravity is peculiar to bodies projected upwards. A body thrown upwards is retarded after the same manner as a falling body is accelerated; only in the one case the force of gravity conspires with the motion acquired, and in the other it acts contrary to it.

As the force of gravity is uniform, the retardation from that cause will be equal in equal times. Hence, as it is the same force which generates motion in the falling body, and diminishes it in the rising one, a body rises till it loses all its motion; which it does in the same time in which a body falling would have acquired a velocity equal to that with which the body was thrown up.

Also, a body thrown up will rise to the same height from which, in falling, it would acquire the same velocity with which it was thrown up: therefore the heights to which bodies can rise, when thrown up with different velocities, are to each other as the squares of the velocities.

Retardations are, therefore, 1st. As the squares of the velocities. 2dly. As the densities of the fluids through which the bodies are moved. 3dly. Inversely as the diameter of those bodies. 4thly. Inversely as the densities of the bodies themselves. All of which is evidently expressed in the preceding theorem $\frac{nv^2}{Nd}$.

RETA'RDER. *s.* (from *retard.*) Hinderer; obstructer (*Glanville*).

To RETCH. *v. n.* (hnæcan, Saxon.) To force up something from the stomach.

RETCHLESS. *a.* Careless; reckless (*Dryden*).

RETE. (from *reskta*, Heb.) A net; a congeries of vessels, or any animal or vegetable substance resembling a net.

RETE MIRABILE, in anatomy, a small plexus or net-work of vessels in the brain, surrounding the pituitary gland.

RETE MUCOSUM. (*rete*, a net.) Corpus reticulare. Corpus mucosum. Mucus Malphigii. A mucous substance, deposited, in a net-like form, between the epidermis and cutis, which covers the sensible cutaneous papillæ, connects the epidermis with the cutis, and gives the colour to the body: in Europeans it is of a white colour, in Ethiopians black. See SKIN.

RETE'CTION. *s.* (*retectus*, Latin.) The act of discovering to the view (*Boyle*).

RETEL, a town of France, in the department of Ardennes. Before the revolution, it was the capital of a country called the Retelois. It is seated on a hill, near the river Aisne, 26 miles N.E. of Rheims. Lon. 4. 24 E. Lat. 49. 32 N.

RETE'NTION. *s.* (*retention*, French.) 1. The act of retaining (*Bacon*). 2. *Retention* and retentive faculty is that state of contraction in the solid parts, which makes them hold fast their proper contents (*Quincy*). 3. Memory (*South*). 4. The act of withholding any thing (*Shakspeare*). 5. Custody; confinement; restraint (*Shakspeare*).

RETE'NTIVE. *a.* (*retentif*, French.) 1. Having the power of retention (*Philips*). 2. Having memory (*Glanville*).

RETE'NTIVENESS. *s.* (from *retentive.*) The quality of retention.

RETFORD (East), a borough in Nottinghamshire, with a market on Saturday, seated on the Idle, 30 miles N. by E. of Nottingham, and 141 N. by W. of London.

RETHEM, a town of Lower Saxony, in the duchy of Zell, seated in a very fertile country, on the Aller, 35 miles N.N.W. of Hanover.

RETICENCE. *s.* (*reticence*, French; *reticentia*, Latin.) Concealment by silence.

RETICLE. *s.* (*reticulum*, Latin.) A small net.

RETI'CULAR. *a.* (from *reticulum*, Lat.) Having the form of a small net.

RETICULARIA, in botany, a genus of the class cryptogamia, order fungi. Fungus roundish; case rigid, filled with seeds dispersed among reticulate filaments. Thirteen species; a few possessing a stem, the greater part stemless; four common to our own country: one or two resembling the lycoperdon.

RETICULATE. (from *rete*, a net.) Corolla, petalla. A netted corol. Netted petals. Having distinct veins crossing like net-work.—Beautifully exemplified in geranium striatum.

RETI'CULATED. *a.* (*reticulatus*, Latin.) Made of network; formed with interstitial vacuities (*Woodward*).

RE'TIFORM. *a.* (*retiformis*, Lat.) Having the form of a net (*Ray*).

RETIMO, a seaport of Candia, and a bishop's see, with a citadel, where the pacha resides. It was taken, in 1645, by the Turks, who have kept it ever since. The silk, wool, honey, wax, laudanum, and oil, are preferred to all others. It is seated on the N. coast of the island, 42 miles W. of Candia. Lon. 24. 38 E. Lat. 35. 20 N.

RETINA. (from *rete*, a net.) The third or innermost membrane of the eye expanded round the choroid coat, to the ciliary ligament. It is by most regarded as the true organ of vision, and is formed by an expansion of the pulp of the optic nerve. But a philosopher of the present day, Mr. Andrew Horn, has called this in question. See VISION.

RETI'NUE. *s.* (*retenue*, French.) A number attending upon a principal person; a train; a meiny (*Rogers*).

To RETI'RE. *v. n.* (*retirer*, French.) 1. To retreat; to withdraw; to go to a place of privacy (*Davies*). 2. To retreat from danger (*Milton*). 3. To go from a public station (*Addison*). 4. To go off from company (*Arbuthnot*). 5. To withdraw for safety (*Maccabees*).

To RETI'RE. *v. a.* To withdraw; to take away (*Clarendon*).

RETI'RE. *s.* (from the verb.) Not in use. 1. Retreat; recession (*Shakspeare*). 2. Retirement; place of privacy (*Milton*).

RETI'RED. *part. a.* (from *retire.*) 1. Secret; private (*Ben Jonson*). 2. Withdrawn.

RETI'REDNESS. *s.* (from *retired.*) Solitude; privacy; secrecy (*Donne*).

RETI'REMENT. *s.* (from *retire.*) 1. Private abode; secret habitation (*Denham*). 2. Private way of life (*Thomson*). 3. Act of withdrawing (*Milton*). 4. State of being withdrawn (*Locke*).

RETO'LD. part. pass. of *retell.* Related or told again (*Shakspeare*).

To RETO'RT. *v. a.* (*retortus*, Latin.) 1. To throw back; to rebound (*Milton*). 2. To return any argument, censure, or incivility (*Hammond*). 3. To curve back (*Bacon*).

RETO'RT. *s.* (*retortum*, Latin.) 1. A censure or incivility returned (*Shakspeare*).

RETORT. (from *retorqueo*, to bend back again.) In chemistry, a crooked matrass, conducting the substance introduced into it, and sublimated or evaporated over the heat to which it is exposed, into a recipient, into the neck of which its own neck is inserted, and if necessary, luted. It is the most common and most useful instrument in distillation.

It derives its name from its curved or twisted form. The swell or most capacious part is called its belly; the upper part its arch or roof; and the bent part, which compared with the belly usually forms an angle of about sixty, its neck, which should be free and wide, but gradually diminish in diameter to the extremity of its neck or mouth. The belly of the retort is more usually round; though frequently oblong, and shaped like a cucurbit. These last are called English retorts, and are preferable in the distillation of substances that are apt to swell, and pass into the receiver anterior to decomposition.

A vessel of this kind which has a little hole pierced in its roof is called a tubulated retort. This hole must be capable of being exactly closed with a stopple of proper materials. Tubulated retorts are employed in distilling substances which it is necessary to introduce after the receiver is joined on, as in operating for marine acid.

Retorts employed in processes for gasses have usually very long necks; for here no width of diameter is wanted for the condensation of vapours, and the narrowness of the neck allows but little admixture of the external air. Retorts are made of glass, earthenware, and sometimes of iron or silver: a leaden retort, moreover, is occasionally used, as in the process for fluoric acid.

RETO'RTER. *s.* (from *retort.*) One that retorts.

RETO'RTION. *s.* (from *retort.*) The act of retorting.

To RETO'SS. *v. a.* (*re* and *toss.*) To toss back (*Pope*).

To RETOU'CH. *v. a.* (*retoucher,* Fr.) To improve by new touches (*Pope*).

To RETRA'CE. *v. a.* (*retracer,* Fr.) To trace back; to trace again (*Dryden*).

To RETRA'CT. *v. a.* (*retractus,* Latin.) 1. To recall; to recant (*Shakspeare*). 2. To take back; to resume (*Woodward*).

To RETRA'CT. *v. n.* To unsay; to withdraw concession (*Granville*).

RETRACTA'TION. *s.* (*retractatio,* Lat.) Recantation; change of opinion declared.

RETRA'CTION. *s.* (from *retract.*) 1. Act of withdrawing something advanced; or changing something done (*Woodward*). 2. Recantation; declaration of change of opinion (*Sidney*). 3. Act of withdrawing a claim (*King Charles*).

RETRACTOR ANGULI ORIS, in myology. Albinus calls the buccinator thus. See BUCCINATOR.

RETRAHENTES AURIS. In myology. Posterior auris of Winslow. Two small bundles of muscular fibres which arise from the external and posterior part of the mastoid process of the temporal bone immediately above the insertion of the sterno-cleido-mastoideus muscle. They are inserted into that part of the back of the ear which is opposite to the septum which divides the concha and scapha. Their use is to draw the ear backwards, and stretch the concha.

RETRAITS, in the manage, pricks or injuries to a horse from nails or similar instruments. If a prick with a nail be neglected, it may occasion a very dangerous sore, and fester so that the foot cannot be saved without extreme difficulty; and therefore great care ought to be taken to avoid such fatal consequences. See PRICKING.

When a farrier in shoeing a horse, perceives that he complains and shrinks at every blow upon the nail, it should be immediately pulled out, and, if the blood follow, there is no danger, only he must not drive another nail in the same place; such an accident seldom makes a horse halt, and he may be ridden immediately after it. When a horse halts immediately after he is shod, we may reasonably conclude, that some of the nails press the soft parts, or touch him in the quick.

To know where the mischief lies, farriers take up the lame foot, and knock with a shoeing hammer. If they perceive that the horse shrinks when any particular nail is struck, they conclude him to be pricked in that place. See the articles FOOT, SHOEING, &c.

RETREA'T. *s.* (*retraitte,* French.) 1. Act of retiring (*Pope*). 2. State of privacy; retirement (*Pope*). 3. Place of privacy; retirement (*L'Estrange*). 4. Place of security (*Milton*). 5. Act of retiring before a superior force. Retreat is less than flight (*Bacon*).

To RETREA'T. *v. n.* (from the noun.) 1. To go to a private abode (*Milton*). 2. To take shelter; to go to a place of security. 3. To retire from a superior enemy. 4. To go out of the former place (*Woodward*).

RETREA'TED. *part. a.* (from *retreat.*) Retired, gone to privacy (*Milton*).

To RETRE'NCH. *v. a.* (*retrancher,* French.) 1. To cut off; to pare away (*Dryden*). 2. To confine: improper (*Addison*).

To RETRE'NCH. *v. n.* To live with less magnificence or expence (*Pope*).

RETRE'NCHMENT. *s.* (*retranchement,* Fr.) The act of lopping away (*Atterbury*).

RETRENCHMENT, in the art of war, any kind of work raised to cover a post, and fortify it against the enemy, such as fascines loaded with earth, gambions, barrels of earth, sandbags, and generally all things that can cover the men and stop the enemy. See FORTIFICATION.

To RETRIBUTE. *v. a.* (*retribuo,* Latin.) To pay back: to make repayment of (*Locke*).

RETRIBU'TION. *s.* (*retribution,* French.) Repayment; return accommodated to the action (*South*).

RETRI'BUTIVE. RETRI'BUTORY. *a.* (from *retribute.*) Repaying; making repayment.

RETRIE'VABLE. *a.* (from *retrieve.*) That may be retrieved.

To RETRIE'VE. *v. a.* (*retrouver,* French.) 1. To recover; to restore (*Rogers*). 2. To repair (*Prior*). 3. To regain (*Dryden*). 4. To recall; to bring back (*Berkeley*).

RETROA'CTION. *s.* Action backward.

RETROCE'SSION. *s.* (*retrocessum,* Lat.) The act of going back.

RETROCESSION OF THE EQUINOX. See PRECESSION.

RETROCO'PULATION. *s.* (*retro* and *copulation.*) Postcoition (*Brown*).

RETROFLEX, in botany, applied to the branches. Rami retroflexi: horsum vorsum divaricati. Bending this way and that, in different directions, usually in a distorted manner. Thus it seems to differ from reflex, which is only simply bent back at an angle. Dr. Berkenhout explains it to be three times bent, or bent in three different directions. But for this we know not that he has any warrant, either from the sense of the term, or the explanation. It does not occur in Philosophia Botanica.

RETROFRACT. In botany. Retrofracted. Applied to the peduncle.—Vi quasi ad dependentiam redactus. Delin. Pl.—Reduced to hang down as it were by force. So that it appears as if it had been broken.—We do not discover any reason why this and the foregoing term should have a different signification from reflexus and refractus.

RETROGRADA'TION. *s.* (*retrogradation*, French.) The act of going backward (*Ray*).

RE'TROGRADE. *a.* (*retrograde*, French.) 1. Going backward (*Bacon*). 2. Contrary; opposite (*Shakspeare*).

To RE'TROGRADE. *v. n.* (*retrograder*, Fr.) To go backward (*Bacon*).

RETROGRE'SSION. *s.* (*retro* and *gressus*, Lat.) The act of going backward (*Brown*).

RETROMI'NGENCY. *s.* (*retro* and *mingo*, Latin.) The quality of staling backward.

RETROMI'NGENT. *a.* (*retro* and *mingens*, Latin.) Staling backward (*Brown*).

RE'TROSPECT. *s.* (*retro* and *specio*, Lat.) Look thrown upon things behind or things past (*Addison*).

RETROSPE'CTION. *s.* (from *retrospect.*) Act or faculty of looking backward (*Swift*).

RETROSPE'CTIVE. *a.* (from *retrospect.*) Looking backward (*Pope*).

RETROVERSION. See UTERUS (Retroversion of).

To RETU'ND. *v. a.* (*retundo*, Latin.) To blunt; to turn (*Ray*).

To RETU'RN. *v. n.* (*retourner*, French.) 1. To come again to the same place (*Milton*). 2. To come back to the same state (*Locke*). 3. To go back (*Locke*). 4. To make answer (*Pope*). 5. To come back; to come again; to revisit (*Milton*). 6. After a periodical revolution, to begin the same again (*Milton*). 7. To retort; to recriminate (*Dryden*).

To RETU'RN. *v. a.* 1. To repay; to give in requital (*Milton*). 2. To give back (*Chron.*). 3. To send back (*Milton*). 4. To give account of (*Graunt*). 5. To transmit (*Clarendon*).

RETU'RN. *s.* (from the verb.) 1. Act of coming back to the same place (*Dryden*). 2. Retrogression. 3. Act of coming back to the same state (*Kings*). 4. Revolution; vicissitude (*Bacon*). 5. Repayment of money laid out in commodities for sale (*Bacon*). 6. Profit; advantage (*Taylor*). 7. Remittance; payment from a distant place (*Shakspeare*). 8. Repayment; retribution; requital (*Dryden*). 9. Act of restoring or giving back; restitution (*South*). 10. Relapse (*Swift*). 11. Report; account: *the sheriffs'* return.

RETURN (*returna* or *retorna*), in law, is used in divers senses. 1. Return of writs by sheriffs and bailiffs is a certificate made by them to the court, of what they have done in relation to the execution of the writ directed to them. This is written on the back of the writ by the officer, who thus sends the writ back to the court from whence it issued, in order that it may be filed. 2. Return of a commission, is a certificate or answer sent to the court from whence the commission issues, concerning what has been done by the commissioners. 3. Returns, or days in bank, are certain days in each term, appointed for the return of writs, &c. Thus Hilary term has four returns, viz. in the king's-bench, on the day next after the octave, or eighth day after Hilary day; on the day next after the fifteenth day from St. Hilary; on the day after the purification; and on the next after the octave of the purification. In the common pleas, in eight days of St. Hilary: from the day of St. Hilary, in fifteen days: on the day after the purification: in eight days of the purification. Easter term has five returns, viz. in the king's bench, on the day next after the fifteenth day from Easter: on the day next after the three weeks from Easter: on the day next after one month from Easter: on the day next after five weeks from Easter: and on the day next after the day following ascension day. In the common pleas, in fifteen days from the feast of Easter: in three weeks from the feast of Easter: in one month from Easter day: in five weeks from Easter day: on the day after the ascension day. Trinity term has four returns, viz. on the day following the second day after Trinity: on the day following the eighth day after Trinity: on the day next after the fifteenth day from Trinity: on the day next after three weeks from Trinity. In the common pleas, on the day after Trinity: in eight days of Trinity: in fifteen days from Trinity: in three weeks from Trinity. Michaelmas term has six returns, viz. on the day next after three weeks from St. Michael: on the day next after one month of St. Michael: on the day following the second day after All-souls: on the day next after the second day after St. Martin: on the day following the octave of St. Martin: on the day next after fifteen days of St. Martin. In the common pleas, in three weeks from St. Michael: in one month from St. Michael: on the day after All-souls: on the day after St. Martin: on the octave of St. Martin: in fifteen days from St. Martin. It is to be observed, that, as in the king's bench, all returns are to be made on some particular day of the week in each term, care must be taken not to make the writs out of that court returnable on a non-judicial day; such as Sunday, and All-saints, in Michaelmas term, the purification in Hilary, the ascension in Easter, and Midsummer day, except it should fall on the first day of Trinity term.

RETURNABLE. *a.* Allowed to be reported back (*Hale*).

RETU'RNER. *s.* (from *return.*) One who pays or remits money (*Locke*).

RETURNING STROKE. See ELECTRICITY.

RETUSE LEAF. Retusum folium. In botany. Quod terminatur sinu obtuso. Ending in a blunt sinus: as in Frankenia pulverulenta, Crotalaria retusa.—Applied also to the seed in lycopus.

RETZ, a town of the palatinate of Bavaria, on the river Schwarza, 28 miles E.S.E. of Amberg.

RETZIA, in botany, a genus of the class pentandria, order monogynia. Calyx cylindrical, villous on the outside; stigma bifid; capsule two-celled, many-seeded. One species; a Cape shrub, slightly branched with lateral flowers.

REUCHLIN (John), a German, who contributed to the revival of literature, born at Psorzheim 1455. He studied at Paris and Basil, and acquired great reputation as professor of Greek and Latin. At Rome he was persuaded by the learned of that place to alter his German name, which signifies *smoke*, into the more dignified corresponding Greek word Capnion. He was sent by the court of Wirtemburg as ambassador to the emperor Frederic III. After the death of his patron, he retired to Worms, till again employed at Rome by the elector Palatine. He died at Ingoldstadt 1522, respected as the first scholar who introduced the study of the Hebrew among modern christians. He wrote de arte cabalisticâ, folio, 1517, and the celebrated "epistolæ obscurorum virorum," according to some.

REVE. *s.* The bailiff of a franchise or manor (*Dryden*).

To REVEA'L. *v. a.* (*revelo*, Latin.) 1. To show; to discover; to lay open; to disclose a secret (*Waller*). 2. To impart from heaven (*Romans*).

REVEA'LER. *s.* (from *reveal.*) 1. Discoverer; one that shows or makes known (*Atterbury*). 2. One that discovers to view (*Dryden*).

REVEILLE, formed of the verb *reveiller*, to awake, a beat of a drum in the morning, intended to give notice that it is day-break; and that the soldiers are to arise, and the sentinels forbear challenging.

To RE'VEL. *v. n.* (*raveelen*, Dutch.) To feast with loose and clamorous merriment (*Shakspeare*).

RE'VEL. *s.* (from the verb.) A feast with loose and noisy jollity (*Shakspeare*).

REVEL, a town of France, in the department of Upper Garonne, near the grand basin of the Canal Royal, 27 miles S.E. of Toulouse.

REVEL, a government of Russia. See ESTHONIA.

REVEL, a seaport of Russia, capital of the government of Esthonia, and a bishop's see. It is surrounded by high walls and deep ditches, and defended by a castle and good bastions. The houses are well built, and have fine gardens. Here is a college, with four professors; and, in 1773, two churches were allowed to the Protestants. Since the Russians have had possession of it, it has been a place of great trade. It is seated on the gulf of Finland, partly in a pleasant plain, and partly on a mountain, 85 miles S.E. of Abo, and 133 W. by S. of Petersburgh. Lon. 23. 57 E. Lat. 59. 20 N.

To RE'VEL. *v. a.* (*revello*, Lat.) To retract; to draw back (*Harvey*).

RE'VEL-ROUT. *s.* 1. A mob; an unlawful assembly (*Ainsworth*). 2. Tumultuous festivity (*Rowe*).

REVELATION, *revelatio*, formed from *revelo*, of *re*, and *velum*, q. d. to unveil, the act of revealing, or making a thing public, which before was a secret, or unknown.

The revelation of a confession, made by the confessor, is adjudged, in the Romish church, to deserve the most exemplary punishment.

Revelation is used, by way of eminence, for the discoveries made by God to his prophets, &c. and by them to the world.

Revelation is more particularly used for the discovery which God has made to the world, by the mouths of his prophets, of certain points of faith and duty, which they could not learn from natural reason.

Religion is divided into natural religion, and revelation or revealed religion.

The christian revelation is that made by Christ and his apostles, in the New Testament. The Jewish revelation is that made by Moses and the prophets, in the old Testament. See CHRISTIANITY, JUDAISM, MIRACLE, THEOLOGY, &c.

The principal tests of the truth of any revelation are, the tendency of its practical doctrines; its consistency with itself, and with the known attributes of God; and some satisfactory evidence that it cannot have been derived from a human source.

Before any man can receive a written book as a revelation from God, he must be convinced that God exists, and that he is possessed of almighty power, infinite wisdom, and perfect justice. Now, should a book teaching absurd or immoral doctrines (as many chapters of the Koran do, and as all the traditionary systems of Paganism did) pretend to be revealed by a God of wisdom and justice, we may safely reject its pretensions, without further examination than what is necessary to satisfy us that we have not misunderstood its doctrine. Should a book claiming this high origin, enjoin in one part of it, and forbid in another, the same thing to be done under the same circumstances, we may reject it with contempt and indignation; because a being of infinite wisdom can never act capriciously or absurdly. Still, however, as it is impossible for us to know how far the powers of men may reach in the investigation or discovery of useful truth, some further evidence is necessary to prove a doctrine of divine origin, than its mere consistency with itself, and with the principles of

morality; and this evidence can be nothing but the power of working miracles exhibited by him by whom it was originally revealed. In every revelation confirmed by this evidence, many doctrines are to be looked for which human reason cannot fully comprehend; and these are to be believed on the testimony of God, and suffered to produce their practical consequences. At this kind of belief the shallow infidel may smile contemptuously; but it has place in arts and sciences as well as in religion. Whoever avails himself of the demonstrations of Newton, Bernoulli, and others, respecting the resistance of fluids, and applies their conclusions to the art of ship-building, is as implicit a believer, if he understand not the principles of fluxions, as any Christian; and yet no man will say that his faith is not productive of important practical consequences. He believes, however, in man, while the Christian believes in God; and therefore, he cannot pretend that his faith rests on a surer foundation.

Mr. Locke, in laying down the distinct provinces of reason and faith, observes, 1. That the same truths may be discovered by revelation which are discoverable to us by reason. 2. That no revelation can be admitted *against* the clear evidence of reason. 3. That there are many things of which we have but imperfect notions, or none at all; and others, of whose past, present or future existence, by the natural use of our faculties we cannot have the least knowledge: and these, being beyond the discovery of our faculties, and above reason, when revealed, become the *proper object of our faith.* He then adds, that our reason is not injured or disturbed, but assisted and improved, by new discoveries of truth coming from the fountain of knowledge. Whatever God has revealed is certainly true; but whether it be a divine revelation or not, reason must judge, which can never permit the mind to reject a greater evidence to embrace what is less evident. There can be no evidence that any traditional revelation is of divine original, in the words we receive it, and the sense we understand it, so clear and so certain as that of the principles of reason; and, therefore, nothing that is *contrary* to the clear and self-evident dictates of reason, has a right to be urged or assented to as a matter of faith, wherein reason has nothing to do. Yet it by no means follows (we reiterate the position) that a revelation is to be called in question because it contains doctrines that are *above* reason: because, a revelation would be useless if it only made known to us truths which could have been discovered by our unassisted reasoning capacities.

REVELATION OF ST. JOHN. See APOCALYPSE.

RE'VELLER. *s.* (from *revel.*) One who feasts with noisy jollity (*Pope*).

RE'VELRY. *s.* (from *revel.*) Loose jollity; festive mirth (*Milton*).

To REVE'NGE. *v. n.* (*revancher*, French.) 1. To return an injury (*Pope*). 2. To vindicate by punishment of an enemy (*Dryden*). 3. To wreak one's wrongs on him that inflicted them (*Shakspeare*).

REVE'NGE. *s.* (*revanche*, Fr.) 1. Return of an injury (*Bacon*). 2. The passion of vengeance; desire of hurting one from whom hurt has been received (*Shakspeare*).

REVE'NGEFUL. *a.* (from *revenge.*) Vindictive; full of revenge; full of vengeance (*Shakspeare*).

REVE'NGEFULLY. *ad.* Vindictively (*Dryden*).

REVE'NGEMENT. *s.* (from *revenge.*) Vengeance; return of an injury (*Raleigh*).

REVE'NGER. *s.* (from *revenge.*) 1. One who revenges; one who wreaks his own or another's injuries (*Sandys*). 2. One who punishes crimes (*Bentley*).

REVE'NGINGLY. *ad.* With vengeance; vindictively (*Shakspeare*).

REVE'NUE. *s.* (*revenu*, Fr.) Income; annual profits received from lands or other funds (*Spenser*).

REVENUE (Public), the portion of the general income of a state, which is appropriated to the payment of national expenses. Different nations have adopted different modes of raising a public revenue, but the rent derived from land being obviously a fund of a more permanent nature than most others, has usually been one of the earliest resources, and has sometimes been the principal source of public revenue, particularly in ancient times. From the produce or rent of the public lands, the republics of Greece and Italy derived, for a long time, the greater part of the revenue which defrayed the necessary expenses of the commonwealth; and the rent of the crown-lands constituted the greater part of the revenue of the ancient sovereigns of Europe. The introduction of a different mode of warfare, and the greater duration of modern wars, increased considerably the public expenditure, and rendered it necessary to raise a much greater revenue. In the ancient republics of Greece and Italy, every citizen was a soldier, who both prepared himself for service, and served at his own expense; and in the ancient monarchies of Europe, the people, when they served in the field, were, by the condition of their feudal tenures, to be maintained either at their own expense or at that of their immediate lords, without bringing any new charge upon the sovereign. The other necessary expenses of government were very moderate. The administration of justice, instead of being a cause of expense, was a source of revenue. The labour of the country people, for three days before and after harvest, was thought a sufficient provision for maintaining all the bridges, highways, and other public works, which the commerce of the country was supposed to require. In those days, the principal expense of the sovereign seems to have consisted in the maintenance of his own family and household. The officers of his household, accordingly, were then the great officers of state. The lord treasurer received his rents; the lord steward and lord chamberlain looked

after the expenses of his family; the care of his stables was committed to the lord constable and the lord marshal; his houses were all built in the form of castles, and the keepers of those houses or castles might be considered as a sort of military governors, who seem to have been the only military officers it was necessary to maintain in time of peace. In these circumstances, the rent of a considerable landed estate might, upon ordinary occasions, very well defray all the usual expenses of government, and whenever extraordinary circumstances caused a greater expense, the sum necessary to make it good was drawn from the people by some arbitrary and often very unequal imposition.

The ordinary revenue of the early kings of England consisted of the following branches:

1. Rents and profits of the crown-lands. This must have been considerable, as it appears from Domesday-book, that there were appropriated to the use of the crown 1422 manors, besides other lands and quit-rents. This ancient branch of the king's revenue has, however, of late years become of very small amount, as the lands originally reserved by the crown, or which came to it afterwards by forfeiture, have been almost entirely granted away.

2. Profits from military tenures. As a great part of the lands in England were subject to knight-service, the profits incident to this tenure were very great, besides the extraordinary contributions to which they were liable, for making the king's eldest son a knight, and for marrying his eldest daughter.

3. The custody of the lay-revenues, lands, and tenements of bishoprics, during their vacancy; and, before the dissolution of abbeys, the custody of the temporalities of such as were of royal foundation. Many of the kings were induced to keep the see a long time vacant in order to enjoy their temporalities.

4. First-fruits and tenths of all spiritual preferments. The former was the whole of the first year's produce of the preferment, according to a valuation made in 38 Henry III. and afterwards increased in 20 Edward II. The tenths were the tenth part of the whole annual profit of each living, by the same valuation. These revenues were paid to the Pope, till annexed to the crown by 26 Henry VIII. c. 3, when a new valuation was made, by which the clergy are at present rated, and which forms what is commonly called the king's books. These revenues are now vested in trustees for ever, as a fund for the augmentation of poor livings, and form what is usually called queen Ann's bounty.

5. Purveyance and pre-emption, or a right of buying up provisions and other necessaries, for the use of the royal household, at an appraised valuation, in preference to all other persons, and even without the consent of the owner; also of forcibly impressing carriages and horses for the king's use, at a settled price. The purveyors greatly abused their authority, and were of little advantage to the crown; Charles II. therefore, at his restoration, agreed to resign this prerogative, with the military tenures; and the parliament, in lieu thereof, settled on him and his successors for ever a tax on beer and ale, afterwards commonly called the hereditary excise.

6. Fines and forfeitures of various descriptions; also fees to the crown, in a variety of legal matters.

7. The right to all shipwrecks; to treasure-trove; to royal fish, that is, whales and sturgeons, when thrown ashore, or caught near the coast; to all mines of silver or gold; to waifs, or goods stolen and thrown away by the thief in his flight; and estrays, or animals found wandering, and the owner unknown; and to deodands, and forfeitures of lands and goods for offences. These rights producing little profit, have since been mostly granted away to the lords of manors and other liberties.

8. Escheats of lands, upon the defect of heirs to succeed to the inheritance, in which case they reverted to the king.

9. The custody of idiots, and lunatics, the profits of whose lands were received by the king, an allowance being made to them for necessaries.

From these sources, the produce of the remaining branches of which is now very insignificant, the kings of England derived the whole of their ordinary revenue, till commerce raised the produce of the customs into importance, and the parliament ventured to grant the principal part of their produce to the king, for life. Upon extraordinary occasions, Henry II. and some of his successors had recourse chiefly to scutages, which were a composition by those who held knight's fees, in lieu of the military service to which they were bound, and seem to have been at first mere arbitrary compositions, as the king and the persons liable could agree: hydage, and talliage, were taxes of the same nature, upon other lands, and upon cities and boroughs. Tenths and fifteenths were originally the real tenth or fifteenth of all the moveables belonging to the subject; the amount was uncertain, being levied by new assessments on every fresh grant, till the 8 Edward III. when a new assessment was made and recorded in the exchequer, which was the real value at that period of every city, borough, and town in the kingdom, and by this the fifteenths were afterwards levied, according to the specific sums therein stated, which were usually raised in the different places by a common rate on all the inhabitants. Subsidies were a grant introduced about the time of Richard II. and Henry IV.; they were a tax not immediately imposed upon property, but upon persons in respect to their reputed estates, after the nominal rate of four shillings in the pound for lands, and two shillings and eight pence for goods; aliens paid in a double proportion. This assessment was made according to an ancient valuation, which was so low, that one subsidy, according to sir Edward Coke, did not amount to more than

70,000*l.* It was the rule, never to grant more than one subsidy and two-fifteenths at a time; but this rule was broken through on the Spanish invasion in 1588, when the parliament gave two subsidies and four fifteenths. This mode of taxation fell into disuse during the civil wars in the reign of Charles I. when the parliament introduced weekly and monthly assessments, at a fixed sum upon each county, which was levied by a pound rate, both upon lands and personal estates. The commonwealth afterward introduced excise duties, and derived some profit from the establishment of the post-office, both of which have been since improved into very productive sources of revenue.

At the period of the revolution, most of the ancient branches of the king's revenue had either been formally relinquished, or had greatly declined in their produce, and the parliamentary grants had for some years past consisted almost entirely of custom and excise-duties, with occasional poll-taxes and hearth-money. The total amount of the several branches of which the public revenue then consisted will appear by the following statement, which was formed upon the average produce of four years.

Amount of the public revenue in 1688.

	L.	*s.*	*d.*
Subsidy of tonnage and poundage	577,507	12	10½
Hereditary and temporary excise	610,486	10	9
Hearth-money, about	200,000	0	0
Post-office, about	55,000	0	0
Duties on wines and vinegar	172,900	11	8½
Duties on tobacco and sugar	148,861	8	0
Duties on French linens, brandies, &c.	93,710	8	1
Wine licences, seizures, &c.	56,969	4	4
Total	*L*1,915,435	15	9

This was the whole of the public revenue, except the small duties of ten shillings per ton on wine, &c. first granted in 1666, and appropriated for defraying the expenses of coinage; and a duty of eighteen-pence per chaldron on coals, appropriated for completing St. Paul's church. This revenue, small as it now appears, must have been at least fully adequate to all the national expenses, if an account laid before the parliament is to be depended upon, according to which the annual expenditure of James II. amounted at a medium to only 1,609,365*l.* 2*s.* 9*d.*

The heavy expenses incurred during the reign of William III. and the introduction of the funding system, caused a variety of new taxes to be imposed, and considerable additions to be made to those which previously existed. The hearth-tax was abolished, and the land-tax was levied by a new assessment, which has continued ever since. The malt-tax, the tax on hawkers and pedlars, on hackney-coaches, with many other new taxes, were introduced, which, with the augmentation of the customs and excise, raised the total amount of the public revenue, at the death of king William, to about double its amount at his accession. During the succeeding reigns, an almost infinite number of taxes have been imposed, in order to render the revenue adequate to the payment of the interest on the great accumulation of public debt, and to support a constantly increasing expenditure. The produce of different duties formerly constituted separate funds, appropriated to specific purposes; thus the several taxes which were rendered perpetual by 3 George I. c. 7, formed a fund called the general fund, distinct from the aggregate fund, and South Sea fund, before established; but of late years, the whole produce of all the branches of the public revenue has been brought into one fund, called the consolidated fund.

The various duties constituting the total public revenue of Great Britain are arranged under the following heads:

1. The Customs, which consist of duties on goods imported, on goods exported, on goods carried coastways, and a tonnage duty. The total gross produce of this branch of the revenue, in the year ending 5th January 1808, was 12,638,985*l.* 0*s.* 5½*d.* which being subject to various deductions for drawbacks, bounties, charges of management, &c. rendered the net produce, applicable to national purposes, 10,193,172*l.* 19*s.* 5½*d.*

2. The Excise, which consists principally of duties on malt, and malt-liquors of every kind, including the distillery; many other articles are, however, likewise included, as candles, leather, soap, starch, tea, coffee, wine, tobacco, salt, glass, printed goods, and bricks and tiles. The total gross amount of this productive source of revenue, in the year ending 5th January, 1808, was 25,941,630*l.* 13*s.* 8¾*d.* which was reduced, by allowances, drawbacks, and charges of management, to 24,169,716*l.* 13*s.* 0½*d.*

3. Stamp Duties, laid on deeds and documents of almost every description. This mode of taxation was introduced into England in the year 1671, and revived in 1694, when a particular set of commissioners were first appointed for managing these duties; the produce was at first of small amount, but new duties being imposed, to which numerous additions have been since made, it has gradually increased, and, in the year ending 5th January, 1808,

the gross amount was 4,543,971*l.* 17*s.* 5½*d.* This amount is subject to various deductions, as, the charges of management, discounts, and other parliamentary allowances, the cost of parchment and paper for the country distributors, an allowance to the two universities on almanacks and other incidental expenses, which reduced the net produce to 4,458,738*l.* 14*s.* 0¾*d.*

4. Land and Assessed Taxes. The land tax for many years differed from all other branches of the public revenue (except the old malt duty) in being granted annually; it was however regularly continued from year to year, never being wholly taken off, but it varied with respect to the rate at which it was imposed, having been usually reduced during peace and increased again in time of war, to answer in part the increased expenditure. From 1776 to 1798 it was regularly continued at 4*s.* in the pound, at which rate it was supposed to produce 1,989,673*l.* 7*s.* 10¾*d.* for England, and 47,954*l.* 1*s.* 2*d.* for Scotland, making in the whole 2,037,627*l.* 9*s.* 0¾*d.*; there was however a constant deficiency, to the amount, at an average, of about 235,000*l.* per annum, varying according to the regularity with which the tax was collected, and the amount of the different charges to which it was liable. In 1799, a scheme was adopted for the redemption of the land tax, for which purpose an act was passed, making the tax perpetual; it was then offered for sale to the proprietors of the lands upon which it was charged, or, if they declined it, to any other person who chose to become a purchaser. The consideration to be given in either case was not to be in money, but in three per cent. stock; the object of the scheme being to absorb a large quantity of floating stock, and thus facilitate the raising of new loans. It was estimated that this measure would transfer about eighty millions of stock to government, but the terms offered were by no means such as to induce a general approval of it, and the total amount of stock transferred for land-tax redeemed on the first February 1808 was only 22,976,829*l.* 10*s.* 4*d.* of course a very considerable portion of the tax still remained unredeemed. The assessed taxes consist of the duties on houses, windows, servants, carriages, horses, and horse-dealers, dogs, hair powder, and armorial bearings. The gross produce of the land and assessed taxes, in the year ending January 5th, 1808, was 6,909,190*l.* 12*s.* 9¾*d.* and as the balances in the hand at the beginning of the year exceeded the charges of management and other payments, the total net amount applicable to national purposes was 7,073,530*l.* 10*s.* 8¾*d.*

5. The Post Office. King James I. originally erected a post office for the conveyance of letters to foreign parts, and previously to which an establishment of this kind had existed for the conveyance of inland letters. Some improvements were made in the management of it during the time of the commonwealth, and soon after the restoration a new general post office was established, the revenue derived from which was at first of small amount, but has since gradually increased, both from the increase of commercial intercourse, and the additional rates of postage which have since been imposed. In 1715, the gross produce of the inland office was 145,227*l.* in the year 1744 it amounted to 198,226*l.* and the gross amount of both the inland and foreign offices to 235,492*l.* In 1764 it amounted to 281,535*l.* at which time an act was passed for preventing abuses of the privilege of franking, which, with a further restriction at a subsequent period, has considerably improved this source of revenue. The total gross produce for the year ending January 5th, 1808, was 1,493,490*l.* 11*s.* 9*d.* and the net produce 1,277,538*l.* 11*s.* 4½*d.*

6. Sixpence in the pound on pensions and salaries. This deduction originated from a debt of the civil list in the reign of George I. To satisfy this debt an act was passed for raising half a million at five per cent. interest to be charged upon a deduction of sixpence in the pound on all salaries, fees, and wages, payable in respect of offices of profit granted or derived from the crown. About three years after it was found necessary to raise half a million more for the same purpose, and the former sum bearing five per cent. interest was then paid off, the whole sum of 1,000,000*l.* being raised by way of lottery at an interest of three per cent. per annum. This debt is now charged on the consolidated fund, and consequently the duty established for the payment of its interest forms part of the income of the fund. The gross produce for the year ending the 5th of January 1808, was 72,207*l.* 12*s.* 2¾*d.* and the net produce 71,353*l.* 0*s.* 5¾*d.*

7. One shilling in the pound on pensions and salaries. This is a duty of a similar nature with the foregoing, and was first imposed by 31 George II. c. 22. It extends to all salaries, fees, and perquisites, pensions, or gratuities payable out of any revenue belonging to his majesty in Great Britain, exceeding the value of 100*l.* a year. Its gross amount in the year ending the fifth of January 1808, was 61,057*l.* 2*s.* 1*d.* and including a balance in hand at the beginning of the year, the net amount wa 62,685*l.* 5*s.* 8*d.*

8. Hackney coaches. In 1694 the licence of hackney coaches first became a branch of the public revenue. It has increased, both from the number licensed being greater than formerly, and from the duty imposed upon them having been raised very considerably, but it can never become of much importance; it produced in the year ending the 5th of January 1808, 28,751*l.* 15*s.* gross, and 26,455*l.* 2*s.* 5½*d.* net.

9. Hawkers and pedlars. In the year 1697 these itinerant merchants were first made subject to a particular tax, which could never be of much consequence as an object of revenue, and will probably fall off as new towns and villages are built in different parts of the country. The gross amount in the year ending

the 5th of January, 1808, was 13,231*l.* 0*s.* 4d. the net produce 10,325*l.* 9*s.* 5*d.*

In addition to these several branches of the public revenue, there are some small branches of the old hereditary revenue still remaining. These consist chiefly of alienation fines, post fines, seizures of uncustomed and prohibited goods, compositions, proffers, and the crown lands, of which the last is by far the most important.

Abstract of the ordinary revenues and extraordinary resources constituting the public income of Great-Britain, for the year ending the 5th of January 1808.

Ordinary revenues.

	L.	*s.*	*d.*
Net produce of the Customs	7,462,380	4	10¾
Excise (including annual malt duty)	17,896,145	14	2
Stamps	4,458,738	14	0¾
Land and assessed taxes	7,073,530	10	8¾
Post-office	1,277,538	11	4½
Shilling in the pound on pensions, &c.	62,685	5	8
Sixpence in the pound on ditto	71,353	0	5½
Hackney coaches	26,455	2	5½
Hawkers and pedlars	10,325	9	5
Small branches of the Hereditary revenue	91,422	14	7½

Extraordinary resources.

War taxes, viz.-------Customs	2,730,792	14	6½
Excise	6,273,570	18	10½
Property tax	9,864,189	4	10
Arrears of income duty	23,072	19	0
Arrears of taxes under aid and contribution act	2,888	11	2¾
Received for interest of loans raised for Ireland	1,967,677	14	0
Interest on stock transferred for redemption of land tax	5,000	0	0
From the commissioners for issuing Exchequer bills to the merchants of Grenada	33,800	0	0
Imprest money repaid by sundry accountants	33,442	7	8¾
Fees of regulated exchequer offices	40,545	0	2
Lottery net profit, part of 1806 and 1807	774,694	11	0
Surplus of revenue of the Isle of Man	2,210	11	0
Sundry small articles	6,954	12	2
Sum paid into the exchequer on account of public loans, including the last instalment on the loan of 1806	15,257,211	19	3
Total	*L* 75,446,626	11	6½

Expense of collecting the revenues.

	Rate per cent. *L.*	*s.*	*d.*
Customs	6	2	8
Excise	3	2	0
Stamps	2	15	1
Land and assessed taxes	3	17	3
Post-office	22	5	8
One shilling in the pound on pensions	0	13	9
Sixpence in the pound on ditto	0	12	7
Hackney coaches	9	1	3
Hawkers and pedlars	23	0	2
Total average	4	10	5

The net produce of the several branches, after the payment of certain bounties, pensions, and other charges, is paid into the exchequer to be applied to the services to which it is appropriated. The public accounts at the exchequer, both of the revenue and expenditure, were, till within a few years, kept in a peculiar character in use no where else, and which, in the course of time, had become so unintelligible, even to the officers themselves, that it was usual to write all high numbers in common figures under the characters. It is a curious circumstance, that this obscure species of arithmetic was defective in having no characters to express high numbers, as millions, so far were the framers of it from having any idea of the amount to which the public revenue was to be extended.

Sir John Sinclair, in his History of the Public Revenue, gives the following view of its amount at the commencement of each reign:

	Year.	Annual income.
William the Conqueror	1066	£400,000
William Rufus	1087	350,000
Henry I.	1100	300,000
Stephen	1135	250,000
Henry II.	1154	200,000
Richard I.	1189	150,000
John	1199	100,000
Henry III.	1214	80,000
Edward I.	1272	150,000
Edward II.	1307	100,000
Edward III.	1347	154,139
Richard II.	1377	130,000
Henry IV.	1399	100,000
Henry V.	1413	76,643
Henry VI.	1422	64,976
Edward IV.	1460	
Edward V.	1483	100,000
Richard III.	1483	
Henry VII.	1485	400,000
Henry VIII.	1509	800,000
Edward VI.	1547	400,000
Mary	1553	450,000
Elizabeth	1558	500,000
James I.	1602	600,000
Charles I.	1625	895,819
The Commonwealth	1648	1,517,247
Charles II.		1,800,000
James II.	1684	2,001,855
William III.	1688	3,895,205
Queen Anne	1706	5,691,803
George I.	1714	6,762,643
George II.	1727	8,522,540
George III.	1760	8,800,000

The above statement shews a vast increase of the public revenue, particularly from the time of Charles I. but its progress since the year 1760 has been much more remarkable. In 1773 it amounted to 10,066,661*l.*; in 1780 it had advanced to 12,255,214*l.*; and in 1786, when the debts incurred by the American war had been fully provided for, it amounted to 15,096,112*l.* The increase of commerce during the peace naturally improved such branches of the revenue as depended thereon; so that in 1791, its total produce was 16,712,000*l.* In 1808, its amount was as above stated. (*British Encylopædia, Sinclair's History*, &c.).

To REVE'RB. *v. a.* (*reverbero*, Latin.) To resound; to reverberate: not in use (*Shakspeare*).

REVE'RBERANT. *a.* (*reverberans*, Lat.) Resounding; beating back.

To REVE'RBERATE. *v. n.* (*reverbero*, Lat.) 1. To beat back (*Shakspeare*). 2. To heat in an intense furnace, where the flame is reverberated upon the matter to be melted or cleaned (*Brown*).

To REVE'RBERATE. *v. n.* 1. To be driven back; to bound back (*Howel*). 2. To resound (*Shakspeare*).

REVERBERA'TION. *s.* (*reverberation*, French.) The act of beating or driving back (*Addison*).

REVERBERATION, in chemistry, denotes a kind of circulation of the flame by means of a reverberatory, or the return of the flame from the top of the furnace back to the bottom, chiefly used in calcination. Reverberation is of two kinds: the first with a close fire, that is, a reverberatory furnace, where the flame has no vent at top, being covered with a dome or capital, which repels its action back on the matter or the vessel that contains it, with increased vehemence. After this manner is refining, the distillation of acids, spirits, &c. performed. Reverberation with an open fire is that performed in a furnace or reverberatory, whose registers are all open, used in calcination, &c.

REVERBERATORY, in chemistry, a reverberating furnace, or furnace built close all round, and covered at the top with a capital of brick or tiles, so as not to give any vent to the heat or flame, but to determine it to reverberate, or turn back from the brick work with new force upon the matter placed at bottom. When the fire has no vent or passage at top, it is called a whole reverberatory; when the middle of the capital is open, and only the sides close, so that that there is only half a circulation of the flame, it is called a half reverberatory.

This kind of furnace is chiefly used in the fusion and assay of metals and minerals, and on similar occasions where an intense heat is required. See the article FURNACE.

REVERBERA'TORY. *a.* (*reverberatoire*, French.) Returning; beating back (*Moxon*).

To REVE'RE. *v. a.* (*revereor*, Latin.) To reverence; to honour; to venerate; to regard with awe (*Prior*).

RE'VERENCE. *s.* (*reverentia*, Latin.) 1. Veneration; respect; awful regard (*Bacon*). 2. Act of obeisance; bow; courtesy (*Dryden*). 3. Title of the clergy (*Shakspeare*). 4. Poetical title of a father (*Shakspeare*).

To RE'VERENCE. *v. a.* (from the noun.) To regard with reverence; to regard with awful respect (*Rogers*).

RE'VERENCER. *s.* (from *reverence*.) One who regards with reverence (*Swift*).

RE'VEREND. *a.* (*reverend*, French.) 1. Venerable; deserving reverence; exacting respect by his appearance (*Pope*). 2. The honorary epithet of the clergy.

The religious abroad are called reverend fathers, and abbesses, prioresses, &c. reverend mothers. In England, bishops are right reverend, and archbishops most reverend. In France, before the revolution, their bishops, archbishops, and abbots, were all alike most reverend. In Scotland, the clergy individually are reverend, a synod is very reverend, and the general assembly is venerable.

RE'VERENT. *a.* (*reverens*, Lat.) Humble; expressing submission; testifying veneration (*Pope*).

REVERE'NTIAL. *a.* (*reverentielle*, Fr.) Expressing reverence; proceeding from awe and veneration (*Donne*).

REVERE'NTIALLY. *ad.* (from *reverential.*) With show of reverence (*Brown*).

REVERENTLY. *ad.* (from *reverent.*) Respectfully; with awe; with reverence (*Shakspeare*).

REVE'RER. *s.* (from *revere.*) One who venerates; one who reveres (*Government of the Tongue*).

REVERIE, the same with delirium, raving, or distraction. It is used also for any ridiculous, extravagant imagination, action, or proposition, a chimæra, or vision. But the most ordinary use of the word among English writers, is for a deep disorderly musing or meditation.

REVERO, a strong town of Italy, in the Mantuan, seated on the Po, opposite Ostiglia, 10 miles N.E. of Mirandola, and 20 S.E. of Mantua. Lon. 1. 9 E. Lat. 44. 58 N.

REVE'RSAL. *s.* (from *reverse.*) Change of sentence (*Bacon*).

To REVE'RSE. *v. a.* (*reversus*, Latin.) 1. To turn upside down (*Temple*). 2. To overturn; to subvert (*Pope*). 3. To turn back (*Milton*). 4. To contradict; to repeal (*Hooker*). 5. To turn to the contrary (*Pope*). 6. To put each in the case of the other (*Rogers*). 7. To recall; to renew: obsolete (*Spenser*).

To REVE'RSE. *v. n.* (*revertere*, *reversus*, Latin.) To return (*Spenser*).

REVE'RSE. *s.* (from the verb.) 1. Change; vicissitude (*Dryden*). 2. A contrary; an opposite (*Rogers*). 3. (*revers*, French.) The side of the coin on which the head is not impressed (*Camden*).

REVE'RSIBLE. *a.* (*reversible*, Fr. from *reverse.*) Capable of being reversed.

REVE'RSION. *s.* (*reversion*, French.) 1. The state of being to be possessed after the death of the present possessor (*Hammond*). 2. Succession; right of succession (*South*).

REVERSION, in law, is defined to be returning of lands, &c. into the possession of the donor, or his heirs. Reversion, in the law of England, has two significations; the one of which is an estate left, which continues during a particular estate in being; and the other is the returning of the land, &c. after the particular estate is ended; and it is further said to be an interest in lands, when the possession of it fails; or where the estate which was for a time parted with, returns to the grantors, or their heirs. But, according to the usual definition of a reversion, it is the residue of an estate left in the grantor, after a particular estate granted away ceases, continuing in the grantor of such an estate.

The difference between a remainder and a reversion, consists in this: that the remainder may belong to any man except the grantor; whereas the reversion returns to him who conveyed the lands, &c.

REVERSION OF SERIES, in algebra, is the finding the value of the root, or unknown quantity, whose powers enter the terms of an infinite series, by means of another infinite series in which it is not contained. As, in the infinite series $z = ax + bx^2 + cx^3 + dx^4$ &c.; then if there be found $x = Az + Bz^2 + Cz^3$ &c. that series is inverted, or its root x is found in an infinite series of other terms.

This was one of Newton's improvements in analysis, the first specimen of which was given in his Analysis per Æquationes Numero Terminorum Infinitas; and it is of great use in resolving many problems in various parts of the mathematics.

The most usual and general way of reversion is to assume a series, of a proper form, for the value of the required unknown quantity; then substitute the powers of this value instead of those of that quantity into the given series; lastly compare the resulting terms with the said given series, and the values of the assumed coefficients will thus be obtained. So, to revert the series $z = ax + bx^2 + cx^3$, &c. or to find the value of x in terms of z; assume it thus, $x = Az + Bz^2 + Cz^3$, &c.; then by involving this series, for the several powers of x, and multiplying the corresponding powers by a, b, c, &c. there results

$$\begin{aligned} z = aAz &+ aBz^2 &+ aCz^3 &+ aDz^4, \text{ &c.} \\ &+ bA^2z^2 + 2bABz^3 &+ 2bACz^4 \\ & &+ bB^2z^4 \\ & + cA^3z^3 &+ 3cA^2Bz^4 \\ & &+ dA^4z^4 \end{aligned}$$

Then by comparing the corresponding terms of this last series, or making their coefficients equal, there are obtained these equations, viz.

$aA - 1$, and $aB + bA^2 = 0$, and $aC + 2bAB + cA^3 = 0$, &c. which give these values of the assumed coefficients, viz.

$$A = \frac{1}{a}; \quad B = -\frac{bA^2}{a} = -\frac{b}{a^3};$$

$$C = -\frac{2bAB + cA^3}{a} = \frac{2bb - ac}{a^5};$$

$$D = -\frac{2bAC + bB^2 + 3cA^2B + dA^4}{a}$$

$$= -\frac{5abc - 5b^3 - a^2d}{a^7}; \text{ &c.}$$

and consequently

$$x = \frac{1}{a}z - \frac{b}{a^3}z^2 + \frac{2bb - ac}{a^5}z^3 - \frac{5abc - 5b^3 - a^2d}{a^7}z^4, \text{ &c.}$$

which is therefore a general formula or theorem for every series of the same kind, as to the powers of the quantity x. Thus, for

Ex. Suppose it were required to revert the series $z = x - x^2 + x^3 - x^4$, &c.

Here $a = 1$, $b = -1$, $c = 1$, $d = -1$, &c; which values of these letters being substituted in the theorem, there results

$x = z + z^2 + z^3 + z^4$, &c. which is that series reverted, or the value of x in it.

In the same way it will be found that the theorem for reverting the series $z = ax + bx^3 + cx^5 + dx^7$ &c. is

$$x = \frac{1}{a} z - \frac{b}{a^4} z^3 + \frac{3bb - ac}{a^7} z^5 - \frac{a^2 d + 12b^3 - 8abc}{a^{10}}, \text{ &c.}$$

And if $z = ax^m + bx^{m+n} + cx^{m+2n} +$ &c. then is

$$x = y^{\frac{1}{m}} - \frac{b}{ma} y^{\frac{1+n}{m}} + \frac{(1 + 2n + m)\, bb - 2mac}{2mmaa} \times y^{\frac{1+2n}{m}} \text{ &c.}$$

where y is $= \frac{z}{a}$.

Various methods of reversion may be seen as given by De Moivre in the Philosophical Transactions, number 240; or Maclaurin's Algebra, pa. 263; or Stuart's Explanation of Newton's Analysis, &c. pa. 455; or Coulson's Comment on Newton's Flux. pa. 219; or Horsley's ed. of Newton's works, vol. 1. pa. 291; or Simpson's Flux. vol. 2. pa. 302: or most authors on algebra. (*Hutton's Dictionary*).

REVE'RSIONARY. *a.* (from *reversion.*) To be enjoyed in succession (*Arbuthnot*).

REVERSIS. (from *revertir*, Spanish, to change.) In playing-cards, a Spanish game played by four persons, with every one a box, containing six contracts, reckoned as 48 fishes each, twenty counters 6 fishes each, and 32 fishes, making the fishes in all 400; likewise with two pools, called the great and the little quinola pools, (the great one to be under the little) which are always to be placed on the dealer's right hand. For this game the tens must be taken out from a pack of cards; the deal is to the right; three cards are given to each player the first round, and four to the dealer, afterwards always four, so that the non-dealers will have eleven cards each, and the dealer twelve, with three remaining, to be placed singly in the middle of the table opposite to each non-dealer, who is to put out a card, under the pools, and replace it with the card that is opposite to him on the table: the dealer likewise puts out one, but does not take in: should there, however, be three remises or stakes in the pools, then it is in any player's option to take a card; if he do not, he may see the card, before the same is placed to the discard; then, previous to playing any card, the opposite parties exchange one with each other. The cards rank as at whist, and the points in the tricks are forty, each ace reckoned 4, king 3, queen 2, and knave 1.

The points in the discard, which form the party, reckon as in the tricks, except the ace of diamonds, and the knave of hearts, as great quinola; the former reckoning 5, and the latter 4. The player having the fewest points wins the party. If two have the same number of points, then he who has the fewest tricks has the preference; if points and tricks be equal, then he who dealt last wins; but he who has not a trick has the preference over a trick without points; and the espagnolette played and won, gains the party in preference to the last dealer. When every trick is made by the same person, there is no party; and this is called making the reversis.

The great quinola pool is to consist of twenty-six fishes at the commencement, and to be renewed every time the same is cleared, or has fewer in it than the twenty-six; this stake is attached to the knave of hearts, or great quinola, which cannot be put to the discard, unless there are three stakes, or a hundred fishes in the pool. The little quinola pool, consisting of thirteen fishes, attached to the queen of hearts, as little quinola, is to be renewed in the same manner, in proportion as the other, and the little quinola cannot be put to the discard, unless there are three stakes, or fifty fishes in the pool. Each time either or both of the quinolas are placed, or played on a renounce, they are entitled to the stakes attached to them, except when there are three stakes in the pool, then the great quinola is to receive a hundred fishes and the little quinola fifty: on the contrary, each time the quinolas are forced, gergi or led out, the stakes are to be paid in the same proportion as they would have been received, except in the single instance of the person who played the quinolas making the reversis, when the quinola, to be entitled to any benefit, must be played before the two last tricks.

Every trick must be made by one person to make the reversis, which is undertaken when the first nine tricks are gained by the same person; there is then an end of the party, and of the quinolas if held by him, except he has played both or either of them before the two last tricks; but, on the contrary, should his reversis be broken, he then is not only to pay the reversis broken, but the stakes to the pools, for the quinolas he may have played before the reversis was undertaken. All consolations paid for aces or quinolas, by the person undertaking the reversis, are to be returned on winning it.

The espagnolette is either simply four aces, three aces and one quinola, or two aces and two quinolas. The player having the same, has a right to renounce in every suit, during the whole game, and if he can avoid winning any trick, and there is no reversis, he of course wins the party in preference to him who is better placed; but if obliged to win a trick, he then pays the party to the other, and returns the consolations he may have received for aces or quinolas; and if he has a quinola, he must pay the stake to the pool instead of receiving it. The player having the espagnolette is at liberty to wave his privilege, and play his game as a common one, but loses that privilege the moment he has renounced playing in suit. The player of the espagnolette receives consolation

in any part of the game, if he forces the quinola.

If the reversis be won or broken, the espagnolette pays singly for all the company. When the person holding the espagnolette can break the reversis, he is payed, as before mentioned, by the person whose reversis he broke; he can likewise undertake the reversis, but then his hand must be played as a common game. If the espagnolette have placed his quinola, and there is a reversis either made or broken, he is not to receive the stake; for when the reversis is attempted, the stakes are neither received or paid, except by him who undertakes the same. If, by another player having the ace or king of hearts, the espagnolette have in any part of the game either of his quinolas forced, he pays the stake and his consolation to him that forces, except there is a reversis.

The dealer always puts two fishes into the great quinola pool, and one into the little; besides which, every player, at the commencement, puts into the former six fishes, and into the latter three; and each time the stakes are drawn, or when there are fewer fishes in the pool than the original stake, the pool must be replenished as at first. To the points in the discard, 4 are to be added for the party. The person who gives an ace upon a renounce, receives a fish from the person who wins a trick; and if it be the ace of diamonds, he will receive two. The person who forces an ace receives the same payments from all the players. The great quinola placed upon a renounce, receives six fishes; the little quinola three; and if either of them be forced, the person who forces receives the same payment from each player: and these payments should be made immediately, without being asked for. One or more aces, or either of the quinolas played, or gergi, that is, led out, pay the same, as if they had been forced to the person that wins the party, but it is for him to recollect and demand them. When either ace or quinola are placed, played, or gergi the last card, it is called *à la bonne*, and are paid double, and all payments whatever are double to the person who sits opposite. The payment for the reversis made or broke, is eighty fishes; each player paying twenty, and the opposite party forty, when the reversis is made; but when broken, the whole is paid by the person whose reversis is broken: that is, he pays the person breaking it exactly the same number of fish he would have received had he won it.

Laws of the game.—The person who misdeals, loses his deal.

If any player take his card without having put out to the discard, the deal is void.

The eldest hand ought to take care that all the players have put their stakes into the pools; if not, he must make good the deficiency.

The discard when put out is not to be changed.

The eldest hand should not play a card till the discard is complete; should he have played, he is permitted, if nobody have played to it, to take up the same, and play another.

No person must play before his turn.

If at the end of the game it be perceived there is an error in the discard, the deal must be made again.

When the cards are cut, it is too late to ask for any payments.

To REVE'RT. *v. a.* (*reverto*, Latin.) 1. To change; to turn to the contrary (*Prior*). 2. To reverberate (*Thomson*).

To REVE'RT. *v. n.* (*revertir*, old French.) To return; to fall back (*Bacon*).

REVE'RT. *s.* (from the verb.) Return; recurrence. A musical term (*Peacham*).

REVE'RTIBLE. *a.* (from *revert.*) Returnable.

REVERY'. *s.* (*resverie*, Fr.) Loose musing; irregular thought (*Addison*).

To REVE'ST. *v. a.* (*revestir*, *revêtir*, Fr.) 1. To clothe again (*Spenser*). 2. To reinvest; to vest again in a possession or office.

REVE'STIARY. *s.* (*revestiare*, French.) Place where dresses are reposited (*Camden*).

REVI'CTION. *s.* (*revictum*, Lat.) Return to life (*Brown*).

To REVI'CTUAL. *v. a.* (*re* and *victual.*) To stock with victuals again (*Raleigh*).

To REVI'EW. *v. a.* (*re* and *view.*) 1. To look back (*Denham*). 2. To see again, (*Shakspeare.*) 3. To consider over again; to re-examine (*Dryden*). 4. To retrace (*Pope*). 5. To survey; to overlook; to examine.

REVIE'W. *s.* (*reveue*, French, from the verb.) Survey; re-examination (*Atterbury*).

REVIEW. In the military acceptation of the term, an inspection of the appearance, and regular disposition of a body of troops, assembled for that purpose. At all reviews, the officers should be properly armed, ready in their exercise, salute well, in good time, and with a good air; their uniform genteel, &c. the men should be clean and well-dressed; their accoutrements well put on; very well sized in the ranks; the serjeants expert in their duty, drummers perfect at their beatings, and the fifers play correct. The manual exercise must be performed in good time, and with life; and the men carry their arms well; march, wheel, and form with exactness. All manœuvres must be performed with the utmost regularity, both in quick and slow time. The intention of a review is, to know the condition of the troops, to see that they are complete, and perform their exercise and evolutions well.

REVIEW (Bill of), in chancery, is where a cause has been heard, and the decree signed and enrolled; and some error in law appears upon the decree, or new matter is discovered in time after the decree made, a bill of review is then had.

REVIEW, in literature, a periodical publication which gives analyses and criticisms of the principal new works as they issue from the press. There are several reviews of this kind published in England and Scotland; as the

Monthly Review, the Critical Review, the British Critic, the Eclectic Review, the Edinburgh Review, the Quarterly Review, the British Review, the Edinburgh Quarterly Review, &c. See CRITICISM.

To REVI'LE. *v. a.* (*re* and *vile.*) To reproach; to vilify; to treat with contumely (*Spenser*).

REVI'LE. *s.* (from the verb.) Reproach; contumely; exprobration (*Milton*).

REVI'LER. *s.* (from *revile.*) One who reviles; one who treats another with contumelious terms (*Government of the Tongue*).

REVI'LINGLY. *ad.* (from *revile.*) In an opprobrious manner; with contumely (*Maine*).

REVI'SAL. *s.* (from *revise.*) Review; re-examination (*Pope*).

To REVI'SE. *v. a.* (*revisus*, Latin.) To review; to overlook (*Pope*).

REVI'SE. *s.* (from the verb.) 1. Review; re-examination (*Boyle*). 2. Among printers, a second proof of a sheet corrected (*Felt*).

REVI'SER. *s.* (*reviseur*, Fr.) Examiner; superintendent.

REVI'SION. *s.* (*revision*, French.) Review.

To REVI'SIT. *v. a.* (*revisito*, Latin.) To visit again (*Milton*).

REVI'VAL. *s.* (from *revive.*) Recall from a state of languor, oblivion, or obscurity.

To REVI'VE. *v. n.* (*revivre*, French.) 1. To return to life (*Kings*). 2. To return to vigour or fame; to rise from languor, oblivion, or obscurity (*Milton*).

To REVI'VE. *v. a.* 1. To bring to life again (*Milton*). 2. To raise from languor, insensibility, or oblivion (*Spenser*). 3. To renew; to recollect; to bring back to the memory (*Locke*). 4. To quicken; to rouse (*Shakspeare*). 5. To recomfort; to restore to hope (*Ezra*). 6. To bring again into notice (*Swift*). 7. [In chemistry.] To recover from a mixed state.

REVI'VER. *s.* (from *revive.*) That which invigorates or revives.

To REVIVI'FICATE. *v. a.* (*revivifier*, French.) To recall to life.

REVIVIFICA'TION. *s.* (from *revivificate.*) The act of recalling to life (*Spectator*).

REVIVI'SCENCY. *s.* (*revivisco*, *reviviscentia*, Lat.) Renewal of life (*Burnet*).

REU'NION. *s.* (*reunion*, French.) Return to a state of juncture, cohesion, or concord.

To REUNI'TE. *v. a.* (*re* and *unite.*) 1. To join again; to make one whole a second time; to join what is divided (*Shakspeare*). 2. To reconcile; to make those at variance one.

To REUNI'TE. *v. n.* To cohere again.

RE'VOCABLE. *a.* (*revocable*, French.) 1. That may be recalled (*Bacon*). 2. That may be repealed.

RE'VOCABLENESS. *s.* (from *revocable.*) the quality of being revocable.

To RE'VOCATE. *v. a.* (*revoco*, Latin.) To recall; to call back (*Daniel*).

REVOCA'TION. *s.* (*revocatio*, Lat.) Act of recalling (*Hooker*). 2. State of being recalled (*Howel*). 3. Repeal; reversal (*Ayliffe*).

To REVO'KE. *v. a.* (*revoquer*, Fr. *revoco*, Lat.) 1. To repeal; to reverse (*Dryden*). 2. To check; to repress (*Spenser*). 3. To draw back (*Davis*).

REVO'KEMENT. *s.* (from *revoke.*) Revocation; repeal; recall (*Shakspeare*).

To REVO'LT. *v. n.* (*revolter*, Fr.) 1. To fall off from one to another (*Shakspeare*). 2. To change: not in use (*Shakspeare*).

REVO'LT. *s.* (*revolte*, Fr.) 1. Desertion; change of sides (*Raleigh*). 2. A revolter; one who changes sides: not in use (*Shakspeare*). 3. Gross departure from duty (*Shakspeare*).

REVO'LTED. *part. adj.* (from *revolt.*) Having swerved from duty (*Milton*).

REVO'LTER. *s.* (from *revolt.*) One who changes sides; a deserter; a renegade (*Milton*).

To REVO'LVE. *v. n.* (*revolvo*, Latin.) 1. To roll in a circle; to perform a revolution (*Watts*). 2. To fall back (*Ayliffe*).

To REVO'LVE. *v. a.* 1. To roll any thing round (*Milton*). 2. To consider; to meditate on (*Shakspeare*).

REVOLUTE, in botany, rolled back or downwards.—Revoluta vernatio s. folatio. Applied to the foliation or leafing. Quorum margines laterales utrinque retrorsum, s. versus paginam inferiorem spiraliter convolvunter. When the sides of the leaves (in the bud) are rolled spirally back, or towards the lower surface.—Revolutum folium. A revolute leaf. Quod deorsum revolvitur.—Having the edges rolled back or towards the lower surface: as in rosemary, teucrium fruticans. Revolutus cirrus. A revolute tendril. Spira dimidio itinere retorta. When a spire of the screw, having made half a revolution, turns back in a contrary direction.—Revoluta corolla. A revolute corol: having the petals rolled back, as in asparagus, medeola, lilium chalcedonicum.—Revoluta valvula. A revolute valve. Turned back after it opens: as in the siliqua of cardamine.—This term is opposed to involute or rolled inwards.

REVOLU'TION. *s.* (*revolution*, French; *revolutus*, Latin.) 1. Course of any thing which turns to the point at which it began to move (*Milton*). 2. Space measured by some revolution (*Milton*). 3. Change in the state of a government or country (*Davenant*). 4. Rotation; circular motion. 5. Motion backward (*Milton*).

REVOLUTION, formed from *revolvo*, to roll backwards, in politics, denotes a grand turn or change of government.

There are no states in the world but have undergone frequent revolutions. The abbot de Vertot has furnished us with two or three good histories of the revolutions of Sweden, the revolutions of Rome, &c. There has also recently been a revolution in France, the principal events of which must be too fresh in the

minds of most of our readers to need detailing here.

The REVOLUTION, used with us by way of eminence, denotes the great turn of affairs in England in 1688, when king James II. abdicating, the prince and princess of Orange were declared king and queen of England, &c. See RIGHT OF CROWN.

The true ground and principle upon which that memorable event proceeded was an entirely new case in politics, which had never before happened in our history; the abdication of the reigning monarch, and the vacancy of the throne thereupon. Accordingly, in a full assembly of the lords and commons, met in convention on occasion of this vacancy, both houses came to this resolution: "That king James the Second, having endeavoured to subvert the constitution of the kingdom, by breaking the original contract between king and people; and, by the advice of Jesuits, and other wicked persons, having violated the fundamental laws; and having withdrawn himself out of this kingdom, has abdicated the government, and that the throne is thereby vacant." The lords and commons having determined this fundamental article, that there was a vacancy of the throne, proceeded to fill up that vacancy in such manner as they judged the most proper. And this was done by their declaration of 12 February, 1688, in the following manner: "That William and Mary, prince and princess of Orange, be, and be declared king and queen, to hold the crown and royal dignity during their lives, and the life of the survivor of them; and that the sole and full exercise of the regal power be only in, and executed by, the said prince of Orange, in the names of the said prince and princess, during their joint lives; and after their deceases the said crown and royal dignity to be to the heirs of the body of the said princess; and for default of such issue to the princess Anne of Denmark, and the heirs of her body; and for default of such issue to the heirs of the body of the said prince of Orange." This transaction, founded in equity, and strictly agreeable to the spirit of our constitution, and the rights of human nature, formed a new era in the history of our country, in which the bounds of prerogative and liberty have been better defined, the principles of government more thoroughly examined and understood, and the rights of the subject more explicitly guarded by legal provisions, than in any other period of the English history. Blackst. Comm. book i. p. 211, &c. book iv. p. 433.

REVOLUTION, in geometry. The motion of any figure quite round a fixed line, as an axis, is called the revolution of that figure; and the figure so moving is said to revolve.

Thus, a right-angled triangle, revolving round one of its legs, as an axis, generates, by that revolution, a cone.

REVOLUTION, in astronomy, denotes the period of a star, planet, comet, or other phænomenon; or its course from any point of its orbit, till it return to the same.

The planets have a twofold revolution. The one about their own axis, usually called their diurnal rotation, which constitutes what we call their day.

The other about the sun, called their annual revolution or period, or year. See ASTRONOMY.

To REVO'MIT. *v. a.* (*re* and *vomit.*) To vomit; to vomit again (*Hakewill*).

REVU'LSION. *s.* (*revulsus*, Lat.) The act of revelling or drawing humours from a remote part of the body (*Bacon*).

REVU'LSIVE. *a.* Having the power of revulsion (*Fell*).

REUS, a town of Spain, in Catalonia. It has a considerable trade in wine, brandy, and nuts, which are carted down to Salo, an open but safe road, five miles off. About 20,000 pipes of brandy are annually exported. It is seated in the middle of a most fruitful plain, 35 miles N.E. of Tortosa, and 60 W.S.W. of Barcelona.

REUSS, a river of Swisserland, which rises in the lake of Locendro, between the mountains of Petina and Locendro, flows through the lake of Lucern and the town of that name, and joining the Aar, falls into the Rhine, below Zurzach.

REUTLINGEN, a free imperial town of Suabia, in the duchy of Wirtemburg. It is adorned with handsome public buildings, and has a well frequented college. It is seated on the Echetz, near the Neckar, 10 miles E. of Tubingen, and 37 S. of Stutgard. Lon. 9. 10 E. Lat. 48. 31 N.

REWAH, a town of Hindustan Proper, in the province of Allahabad, 57 miles S.S.W. of Allahabad. Lon. 81. 36 E. Lat. 24. 35 N.

To REWA'RD. *v. a.* (*re* and *award.*) 1. To give in return (*Samuel*). 2. To repay; to recompense for something good (*Milton*).

REWA'RD. *s.* (from the verb) 1. Recompense given for good performed (*Dryden*). 2. It is sometimes used with a mixture of irony, for punishment or recompense of evil.

REWA'RDABLE. *a.* (from *reward.*) Worthy of reward (*Taylor*).

REWA'RDER. *s.* (from *reward.*) One that rewards; one that recompenses (*Swift*).

To REWO'RD. *v. a.* (*re* and *word.*) To repeat in the same words (*Shakspeare*).

REYHER (Samuel), of Schleusingen in Henneberg, professor of mathematics and jurisprudence at Kiel, wrote mathesis biblica—a dissertation on the inscription on the cross of J. C. and on the hour of his crucifixion—and translated Euclid into German. He died at Kiel 1714, aged 79.

REYLOF (Oliver), of Ghent, was eminent as a Latin poet, and wrote poematum libri. 3. et dissertationes de piscibus—opera poetica, &c. and died 1742, aged 72.

REYNA, an ancient town of Spain, in Andalusia, seated in a plain, with a castle built upon an eminence, three miles from Lerna, and in a territory abounding in wine and cattle.

REYNEAU (Charles René), of Brissac in Anjou, taught philosophy at Pezenas and Toulon, and in 1683 was promoted to the mathematical chair at Angers. He published analysis demonstrated, 2 vols. 4to. a popular work, in which he reduced to a body the theories of Newton, Descartes, Leibnitz, &c. He published science du calcul des grandeurs, 2 vols. 4to. and a tract on logic, 12mo. and died 1728, aged 78.

REYNER (Edward), author of precepts of christian practice—vindication of human learning and universities, was a native of Yorkshire, and educated at Cambridge. He settled at Lincoln 1627, but was ejected for nonconformity at the restoration, and died soon after. His son John was fellow of Emanuel college, Cambridge. He took orders, but was deprived for nonconformity, after which he studied physic, and practised at Nottingham, where he died young. He wrote some things of considerable merit.

REYNOLDS (Edward), of Southampton, was educated at Merton college, Oxford, and appointed rector of Braynton, Northamptonshire, and preacher of Lincoln's Inn. He was a member of the Westminster assembly, and one of the ministers at the Savoy conference, yet he became bishop of Norwich, to the great offence of his dissenting brethren. He died 1676, aged 81. He was a strong calvinist. His works are on theological subjects.

REYNOLDS (Sir Joshua), was born 16th July, 1723, at Plympton in Devonshire. His father was a clergyman, who intended his son Joshua for the church, and sent him to Oxford with that view; but having a turn for drawing, and accidentally meeting with Richardson's Theory, he was resolved to cultivate the profession of a painter. His first master was Mr. Hudson, who had the reputation of making good painters, though not one of the number himself. About 1749 Mr. Reynolds visited Italy, and had for companion and patron the late lord Keppel. He returned to England after two years, highly improved by travel and study, and his first portrait which attracted public attention was that of the above nobleman. His historical pieces afterwards were not less admired, and he was the first promoter of the literary club, of which Johnson, Burke, and other great men, were members. In 1769, the academy of painting, sculpture, and architecture, was established, when the honourable office of president was conferred on Mr. Reynolds, as also the dignity of knighthood. His infirmities, however, obliged him in 1791 to resign his chair. Sir Joshua was fellow of the royal and antiquary societies, and Doctor of Laws, of both Oxford and Dublin, as also member of the company of Painter-stainers in London. He died February 23d, 1792, and was buried in St. Paul's cathedral. Sir Joshua chiefly applied himself to portrait paintings, though he sometimes painted historical subjects in a style of uncommon excellence. His greatest performances in this way were, The infant Hercules, and Count Ugolino. He also shone respectably as an author in the line of his profession, and his works have been published since his death, in 2 vols. 4to.

The following character of him is said to be the production of Mr. Burke:

"His illness was long, but borne with a mild and cheerful fortitude, without the least mixture of any thing irritable or querulous, agreeably to the placid and even tenor of his whole life. He had from the beginning of his malady a distinct view of his dissolution, which he contemplated with that entire composure which nothing but the innocence, integrity, and usefulness of his life, and an unaffected submission to the will of Providence, could bestow. In this situation he had every consolation from family tenderness, which his tenderness to his family had always merited.

"Sir Joshua Reynolds was, on very many accounts, one of the most memorable of men of his time. He was the first Englishman who added the praise of the elegant arts to the other glories of his country. In taste, in grace, in facility, in happy invention, and in the richness and harmony of colouring, he was equal to the great masters of the renowned ages. In portrait he went beyond them; for he communicated to that description of the art in which English artists are the most engaged, a variety, a fancy, and a dignity, derived from the higher branches, which even those who professed them in a superior manner did not always preserve when they delineated individual nature. His portraits remind the spectator of the invention of history and the amenity of landscape. In painting portraits, he appears not to be raised upon that platform, but to descend to it from a higher sphere. His paintings illustrate his lessons, and his lessons seem to be derived from his paintings.

"He possessed the theory as perfectly as the practice of his art. To be such a painter, he was a profound and penetrating philosopher.

"In full happiness of foreign and domestic fame, admired by the expert in the art, and by the learned in science, courted by the great, caressed by sovereign powers, and celebrated by distinguished poets, his native humility, modesty, and candour, never forsook him, even on surprise or provocation; nor was the least degree of arrogance or assumption visible to the most scrutinizing eye in any part of his conduct or discourse.

"His talents of every kind—powerful from nature, and not meanly cultivated in letters—his social virtues in all the relations and all the habitudes of life, rendered him the centre of a very great and unparalleled variety of agreeable societies, which will be dissipated by his death. He had too much merit not to excite some jealousy, too much innocence to provoke any enmity. The loss of no man of his time can be felt with more sincere, general, and unmixed sorrow."

For a complete and very interesting list of plates from paintings by sir Joshua Reynolds,

their dates, and the original prices of many of them, see Selection of curious Articles from the Gentleman's Magazine, vol. iv. pp. 603—633.

REYRAC (François Philippe de St. Laurent de), a French writer, born at Longeville, in Limousin, in 1734. He was bred to the church, and became canon-regular of Chancelade, and died in 1782. He wrote sacred odes, a letter on the eloquence of the pulpit, and several other pieces in poetry and theology.

REZAN, a government of Russia, formerly a province of the government of Moscow. It is fertile in corn, and populous; and had anciently its own princes.

REZAN, a city of Russia, capital of a government of the same name, with an archbishop's see. It was formerly considerable for its extent and riches, but was almost ruined by the Tartars, in 1568. It is seated at the confluence of the Trubesh and Occa, 100 miles S.E. of Moscow. Lon. 40. 37 E. Lat. 54. 55 N.

RHABARBARUM. (from *rha*, and *barbarus*, wild; so called because it was brought from the banks of the Rha in Russia.) Rhabarbarum verum. Rhabarbarum tartaricum. Rheum. Rhubarb. It was not until the year 1732 that naturalists became acquainted with any plant which seemed to afford the rhabarbarum officinale, when some plants received from Russia by Jussieu at Paris, and Raud at Chelsea, were said to supply this important desideratum, and as such were adopted by Linnéus in his first edition of the Species Plantarum, under the name of rheum rhabarbarum. This, however, was not generally received as the genuine rhubarb plant; and with a view to ascertain this matter more completely, Kaun Boerhaave procured from a Tartarian rhubarb merchant the seeds of those plants whose roots he annually sold, and which were admitted at Petersburgh to be the true rhubarb. These seeds were soon propagated, and were discovered by De Gorter to produce two distinct species, viz. the R. rhabarbarum of Linnéus, or as it has since been called, the R. undulatum, and another species, a specimen of which was presented to Linnéus, who declared it to be a new one, and was first mentioned in the second edition of the Sp. Plantarum, in 1762, by the name of R. palmatum. Previous to this time De Gorter had repeatedly sent its seeds to Linnéus, but the young plants which they produced constantly perished; at length he obtained the fresh root, which succeeded very well at Upsall, and afterwards enabled the younger Linnéus to describe this plant, ann. 1767. But two years antecedent to this Dr. Hope's account of the rheum palmatum, as it grew in the botanic garden near Edinburgh, had been read before the Royal Society at London; and of the great estimation in which this plant was held by him we have the following proof; "From the perfect similarity of this root with the best foreign rhubarb, in taste, smell, colour, and purgative qualities, we cannot doubt of our being at last possessed of the plant which produces the true rhubarb, and may reasonably entertain the agreeable expectation of its proving a very important acquisition to Britain."

But from the relation we have given, it appears that both the seeds of the R. palmatum, and the R. undulatum, were transmitted to Petersburgh, as those of the true rhubarb; we are therefore to conclude, that the former species has an equal claim to this importance with the latter; and from further enquiries made in Russia, there is the best authority for believing that the R. compactum also affords this very useful drug. The seeds of the R. palmatum were first introduced into Britain in 1762, by Dr. Hounsy (who sent them from Russia), and were supposed to be a part of that already mentioned; and since their prosperous cultivation by the late professor of botany at Edinburgh, the propagation of this plant has been gradually extended to most of our English gardens, and with a degree of success which promises in time to supersede the importation of the foreign root. Two sorts of rhubarb roots are usually imported into this country for medical use, viz. the Chinese, and the Tartary rhubarb; the first is in oblong pieces, flattish on one side, and convex on the other; compact, hard, heavy, internally of a dull red colour, variegated with yellow and white, and when recently powdered, appears yellow, but on being kept becomes gradually redder. The second is the most valuable, and is brought to us in roundish pieces, with a large hole through the middle of each; it is more soft and friable than the former sort, and exhibits, when broken, many streaks of a bright red colour. "The marks of the goodness of rhubarb are, the liveliness of its colour when cut; its being firm and solid, but not flinty or hard; its being easily pulverable, and appearing when powdered of a fine bright yellow colour; its imparting to the spittle when chewed a deep saffron tinge, and not proving slimy or mucilaginous in the mouth; its taste is subacrid, bitterish, and somewhat styptic; the smell lightly aromatic."

The purgative qualities of rhubarb are extracted more perfectly by water than by rectified spirit: the root remaining after the action of water is almost if not wholly inactive; whereas after repeated digestion in spirit, it proves still very considerably purgative. The virtue of a watery infusion, on being inspissated by a gentle heat is so much diminished, that a dram of the extract is said to have scarcely any greater effect than a scruple of the root in substance. The spirituous tincture loses less; half a dram of this extract proving moderately purgative. The qualities of this root are that of a gentle purgative, and so gentle that it is often inconvenient on account of the bulk of the dose required, which in adults must be from ʒss to ʒj. When given in a large dose it will occasion some griping, as other purgatives do; but it is hardly ever heating to the system, or shows the other effects of the more drastic purgatives. The purgative quality is accompanied with a bitterness, which is often useful in restoring the tone of the stomach when it has been

lost; and, for the most part, its bitterness makes it sit better on the stomach than many other purgatives do. Its operation joins well with neutral laxatives; and both together operate in a lesser dose than either of them would singly. Some degree of stipticity is always evident in this medicine; and as this quality acts when that of the purgative has ceased, so, in cases of diarrhœa, when any evacuation is proper, rhubarb has been considered as the most proper remedy to be employed. It must, however, be remarked here, that in many cases of diarrhœa, no further evacuation than what is occasioned by the disease is necessary or proper. The use of rhubarb, in substance, for keeping the belly regular, for which it is frequently employed, is by no means proper, as the astringent quality is ready to undo what the purgative has done; but it is found that the purpose mentioned may be obtained by it, if the rhubarb is chewed in the mouth, and no more is swallowed than what the saliva has dissolved. And it must be remarked, that in this way employed it is very useful to dyspeptic persons. Analagous to this, is the use of rhubarb in solution, in which it appears, that the astringent quality is not so largely extracted as to operate so powerfully as when the rhubarb was employed in substance.

The officinal preparations of this drug are, a watery and a vinous infusion, a simple and a compound tincture. It is also an ingredient in different compositions; as, the elixir ex aloe et rheo, pilulæ stomachicæ, and some others.

RHABARBARUM ALBUM. See MECHOACANNA.

RHABARBARUM ANTIQUORUM. See RHAPONTICUM.

RHABARBARUM MONACHORUM. Hippolapathum. Patientia. Monks rhubarb. Garden patience. This root, which is supposed to possess the virtues of rhubarb, but in an inferior degree, is obtained from the rumex patientia of Linnéus, and, according to professor Murray, from the rumex alpinus of Linnéus. It is obviously more adstringent than rhubarb, but comes very far short of its purgative virtue.

RHABARBARUM SIBIRICUM. The plant directed for medicinal purposes by this name is the rheum undulatum; foliis subvillosis undulatis petiolis æqualibus of Linnéus. It possesses similar virtues to those of the palmate species, and is in common use in Russia. See RHEUM.

RHABARBARATE. *n.* (from *rhabarbara*, Latin.) Impregnated or tinctured with rhubarb (*Floyer*).

RHABDOIDES. (Ραβδοειδης, formed from ραβδος, rod, or staff, and ειδος, form.) In anatomy, a name given the second true suture of the skull, called also the sagittal suture.

RHABDOLOGY, or RABDOLOGY, in arithmetic, a name sometimes given to the method of performing the two most difficult and operose rules, viz. multiplication and division, by the two easiest, viz. addition and subtraction, by means of two little rods or laminæ, whereon are inscribed the simple numbers, and which are to be shifted according to certain rules.

These rods are what we popularly call Neper's bones, from their inventor, a Scottish baron, who likewise invented logarithms. For their description and use, see NEPER'S BONES.

RHABDOMANCY, an ancient method of divination, performed by means of rods or staves. Whence its name, from the Greek ραβδος, rod, and μαντεια, divination.

St. Jerom makes mention of this kind of divination, in his commentary on Hosea, chap. iv. 12. The same he finds again in Ezekiel xxi. 21, 22.

If it be the same kind of divination that is mentioned in the two passages, rhabdomancy must have been also the same superstition with belomancy.

In effect, the two are ordinarily confounded. The seventy themselves translate the חצים of Ezekiel, by ραβδος, a rod; though in strictness it signifies an arrow.

This, however, is certain; the instruments of divination mentioned by Hosea are different from those of Ezekiel. In the former it is עצו *etso*, מקלו *maklo*, his wood, his staff; in the latter, חצים *hhitsim*, arrows. Though it is possible they might use rods or arrows indifferently; or the military men might use arrows, and the rest rods.

RHACHIS. (Ραχις, the spine of the back.) See SPINE.

RHACHITIS. See RACHITIS.

RHACIA, a promontory in the Mediterranean sea, projecting from the Pyrenean mountains.

RHADAMANTHUS, a son of Jupiter and Europa, was born in Crete, which he abandoned about the 30th year of his age. He passed into some of the Cyclades, where he reigned with so much justice, that the ancients have said he became one of the judges of hell, and that he was employed in the infernal regions in obliging the dead to confess their crimes, and in punishing them for their offences.

RHAGADES. (ραγας, from ρηγνυω, to break or bruise.) Malignant, dry, and deep cutaneous fissures.

RHAGADIOLUS, in botany, a genus of the class syngenesia, order polyandria æqualis. Receptacle naked; seeds bowed, spreading; downless; calyx invested with scales. Three species—Montpelier; Levant; Siberia.

RHAGIO. In the entomology of Fabricius, a tribe of the genus MUSCA, which see.

RHAGIUM. In the entomology of Fabricius, a tribe of the coleopterous genus CERAMBYX, which see.

RHAMA, or RAMA, an incarnate deity of the first rank, in Indian mythology. Sir William Jones believes he was the Dionysos of the Greeks, whom they named Bromius, without knowing why; and Bugenes, when they represented him horned, as well as Lyaios and

Eleutherios the deliverer, and Triambos or Dithyrambos the triumphant.

There are three Rhamas mentioned in the Indian mythology, who together with Crishna, the darling god of the Indian women, are described as youths of perfect beauty. The third Rhama is Crishna's elder brother, and is considered as the eighth Avatar, invested with an emanation of his divine radiance.

RHAMNUS. Buckthorn. In botany, a genus of the class pentandria, order monogynia. Calyx tubular; petals five; scales opposite the stamens; berry superior. Thirty-two species, scattered over the globe; two indigenous to our own country. Of these some are spinous, some prickly, some unarmed. The following are cultivated.

1. R. catharticus. Purging buckthorn. Stem strong, wood, twelve or fourteen feet high; bark of the young shoots a smooth grayish-brown, of the older, darker and rougher; spines terminal; leaves ovate; flowers four-cleft, dicœcous; berry round, pulpy, four-seeded. Found wild in our own hedges; flowers from April to June; berries ripe towards the end of September.

The juice of the berry is a strong purgative, and has for this purpose long formed an article in the pharmacopœias under the name of SPINA CERVINA, which see. The bark is emetic; the juice of the unripe berries mixed with alum forms a yellow dye. The French miniature painters obtain also a delicate and highly prized green from the berries, which they call verdevissa. There is another variety which is a lower shrub, and hence denominated dwarf buckthorn.

2. R. frangula. Alder buckthorn; black alder. An upright tree, branchy, about twelve feet high: unarmed; flowers one-styled, hermaphrodite; leaves very entire, glabrous; berry two-seeded. Flowers appear in June; berries ripe in September. A native of our own woods.

3. R. colubrinus. Pubescent buckthorn. Tree upright; branches horizontal: unarmed; flowers one-styled, hermaphrodite, erect; capsules three-grained; branchlets, petioles, peduncles, and nerves ferruginous-downy. A native of America and the West Indies.

4. R. alaternus. Common alaternus. A shrub, unarmed, with dicœcous flowers; stigma triple; leaves deeply serrate, lanceolate; flowers small, numerous, axillary.

There is a variety with alternate, shining, evergreen leaves. A native of the south of Europe. The fresh branches or young shoots, like the berries of R. catharticus, produce a good yellow dye.

There are also other varieties with variegated leaves or striped, in the former case called bloached phyllyrea by the nurserymen, and in the latter gold or silver striped alaternus, according to the colour.

5. R. infectorius. Narrow-leaved buckthorn. An evergreen plant; spines terminal; flowers four-cleft, dicœcous; leaves ovate-lanceolate, repand, villous underneath; stem procumbent. Indigenous to the south of Europe. There are various other species enumerated by many botanists as belonging to this genus, and especially palmyrus (Christ's thorn), lotus, jujuba, spina Christi, but as these have a drupe with a one or two-celled nut instead of a berry, it is obvious they ought to constitute a distinct genus, and will be found under zizyphus, being jujubes rather than buckthorns. See ZIZYPHUS.

These may be all increased by seeds, layers, or cuttings.

RHANTERIUM, in botany, a genus of the class syngenesia, order polyandria superflua. Receptacle chaffy; down consisting of four or six bristles, thickish, or feathery at top; calyx cylindrical; seeds of the margin naked and without down. A shrub of Barbary with downy branchlets; leaves lanceolate, serrate; flowers terminal, solitary

RHAPIS. Ground rattan. In botany, a genus of the class polygamia, order triœcia. Calyx three-cleft; corol three-cleft; stamens six; pistil one. Two species—one rhapis flabelliformis, common ground rattan, a native of China; the other rhapis arundinacea, simple-leaved rhapis, a native of Carolina.

RHAPONTIC, RHUBARB. See RHAPONTICUM.

RHAPONTICUM. The Rha of Pontus, i. e. the Rha, in Russia, a river on whose banks it grew. Rhabarbarum Dioscoridis. Rhabarbarum antiquorum. The root of this plant, rheum rhaponticum of Linnéus, appears to have been the true rhubarb of the ancients. By some it is confounded with the modern rhubarb, though considerably different from that root in appearance, as well as in quality. The rhapontic is of a dusky colour on its surface, and a loose spongy texture; is more adstringent than rhubarb, and less purgative; in this last intention, two or three drachms are required for a dose. See RHEUM.

RHAPONTICUM VULGARE OFFICINARUM. Centaurium majus. Greater centaury. The root of this plant, centaurea centaureum of Linnéus, was formerly used as an aperient and corroborant in alvine fluxes. It is now totally discarded from the materia medica of this country.

RHA'PSODIST. *s.* (from *rhapsody*.) One who writes without regular dependence of one part upon another (*Watts*).

RHA'PSODY. *s.* (ῥαψῳδια.) Any number of parts joined together without necessary dependence or natural connection (*Hammond*).

RHAPSODY, in antiquity, a discourse in verse sung or rehearsed by a rhapsodist. Others will have rhapsody to signify a collection of verses, especially those of Homer, which having been a long time dispersed in pieces and fragments, were at length by Pisistratus's order digested into books called rhapsodies, from ῥαπτω, *suo*, and ωδη, *canticum*. Hence, among moderns, rhapsody is also used for an assemblage of passages, thoughts, and authorities, raked together from divers authors, to compose some new piece.

RHE, an island on the W. coast of France, in the department of Lower Charente. It is four leagues long and two broad, and very populous. Its products are bitter wine, abundance of salt, excellent brandy, and the liquor called aniseseed. It is defended by four forts, and is eight miles W. of Rochelle. St. Martin is the capital.

RHEA, a daughter of Cœlus and Terra, who married Saturn, by whom she had Vesta, Ceres, Juno, Pluto, Neptune, &c. Her husband, however, devoured them all as soon as born, because he had been informed by an oracle that one of his sons would dethrone him. To stop the cruelty of her husband, Rhea at length, when she brought forth, immediately concealed the child, and Saturn devoured a stone given him as his own child. A year after, the child, whose name was Jupiter, became so powerful, that he drove his father from his throne. Rhea, after the expulsion of her husband, followed him to Italy, where he established a kingdom Her benevolence in this part of Europe was so great, that the golden age of Saturn is often called the age of Rhea. (See SATURNUS.)

RHEGIUM, a town of Italy, in the country of the Brutii, opposite Messana in Sicily, where a colony of Messenians, under Alcidamidas settled, B. C. 723. This town has always been subject to earthquakes, by which it has often been destroyed. See REGGIO.

RHEIMS, an ancient city of France, in the department of Marne, with an archbishop's see. The inhabitants are computed to be 30,000. The principal church, built before the year 406, is a very beautiful gothic structure. That of St. Nicaise is remarkable for its fine architecture. Behind the high altar of the church of St. Remy, the corpse of that archbishop is preserved in a magnificent shrine. In this church was lately La Sainte Ampoule, which is a small phial filled with a reddish and congealed liquor, which the French of former ages thought to have been brought from heaven; and this holy liquor was used in the coronation of the kings of France, who have been successively crowned at Rheims; probably, because Clovis, the founder of the French monarchy, when converted from paganism, was baptized in the cathedral here, in the year 496. The remains of an amphitheatre, a castle, and a triumphal arch, are among the ancient monuments of the Romans. Rheims is long and narrow, and the houses are low. Here are manufactures of flannel, coverlets, and other woollen stuffs: and the gingerbread is famous. Rheims is seated in a plain, surrounded by hills that produce excellent wine, on the river Vesle, 62 miles N. of Troyes, and 75 N.E. of Paris. Lon. 4. 8 E. Lat. 49. 15 N.

RHEINAU, a town of Swisserland, in Thurgau, with an abbey, on an island formed by the Rhine, between Schaffhausen and Eglisau.

RHEINBACH, a town of Germany, in the electorate of Cologne, 19 miles S. of Cologne, and 53 E. of Liege. Lon. 6. 9 E. Lat. 51. 39 N.

RHEINBERG, a town of Germany, in the electorate of Cologne, seated on the Rhine, 40 miles N.W. of Cologne. Lon. 6. 39 E. Lat. 51. 29 W.

RHEINECK, a town of France, in the department of Rhine and Moselle, lately of Germany, in the circle of Lower Rhine; seated on the Rhine, 16 miles N.W. of Coblentz.

RHEINECK, a town of Franconia, capital of a county of the same name, with a castle, on the river Sinn, 25 miles N. by W. of Wurtzburg.

RHEINECK, a town of Swisserland, capital of the Rheinthal, with a castle, seated on the Rhine, near its entrance into the lake of Constance, 25 miles S.E. of Constance. Lon. 9. 35 E. Lat. 47. 21 N.

RHEINFELDEN, a town of Suabia, the best of the four Forest-towns; seated on the Rhine, over which is a bridge, eight miles E. of Basel.

RHEINFELS, a strong fortress of France, in the department of Rhine and Moselle, lately of Germany, in the lower county of Catzenellenbogen. It is one of the most important places on the Rhine, and stands on a stupendous craggy rock, at the foot of which is the fortified town of St. Goar. It was taken by the French in 1794, and is 16 miles S. of Coblentz.

RHEINMAGEN, a town of France, in the department of Roer, lately of Germany, in the duchy of Juliers; situate on the Rhine, 19 miles N.W. of Coblentz.

RHEINTHAL, a district of Swisserland, lying along the Rhine, which divides it from a territory of Austria, till it reaches the lake of Constance. The protestant inhabitants are the most numerous. It is a fertile valley, 30 miles long and from three to eight broad, and produces excellent wine. Rheineck is the capital.

RHETICUS (George Joachim), in biography, a noted German astronomer and mathematician, was born at Feldkirk, in Tyrol, the 15th of February, 1514. After imbibing the elements of the mathematics at Tiguri, with Oswald Mycone, he went to Wittemberg, where he diligently cultivated that science. Here he was made master of philosophy in 1535, and professor in 1537. He quitted this situation, however, two years after, and went to Fruenberg to put himself under the assistance of the celebrated Copernicus, being induced to this step by his zeal for astronomical pursuits, and the great fame which Copernicus had then acquired. Rheticus assisted this astronomer for some years, and constantly exhorted him to perfect his work, De Revolutionibus, which he published after the death of Copernicus, viz. in 1543, folio, at Norimberg, together with an illustration of the same in a narration, dedicated to Schoner. Here too, to render astronomical calculations more accurate, he began his very elaborate canon of sines, tangents, and secants, to fifteen places of figures,

and to every ten seconds of the quadrant, a design which he did not live quite to complete. The canon of sines, however, to that radius, for every ten seconds, and for every single second in the first and last degree of the quadrant, computed by him, was published in folio, at Frankfort, 1613, by Pitiscus, who himself added a few of the first sines computed to twenty-two places of figures. But the larger work, or canon of sines, tangents, and secants, to every ten seconds, was perfected and published after his death, viz. in 1596, by his disciple, Valentine Otho, mathematician to the Electoral Prince Palatine.

After the death of Copernicus, Rheticus returned to Wittemberg, viz. in 1541 or 1542, and was again admitted to his office of professor of mathematics. The same year, by the recommendation of Melancthon, he went to Norimberg, where he found certain manuscripts of Werner and Regiomontanus. He afterwards taught mathematics at Leipsic. From Saxony he departed a second time, for what reason is not known, and went to Poland; and from thence to Cassovia, in Hungary, where he died December the 4th, 1516, near sixty-three years of age.

His Narratio de libris Revolutionum Copernici was first published at Gedunum, in quarto, 1540, and afterwards added to the editions of Copernicus's work. He also composed and published Ephemerides, according to the doctrine of Copernicus, till the year 1551.

Rheticus also projected other works, and partly executed them, though they were never published, of various kinds, astronomical, astrological, geographical, chemical, &c. as they are more particularly mentioned in his letter to Peter Ramus, in the year 1568, which Adrian Romanus inserted in the preface to the first part of his idea of mathematics.

RHETORES, amongst the Athenians, were ten in number, elected by lot to plead public causes in the senate-house or assembly. For every cause in which they were retained, they received a drachm out of the public money. They were sometimes called Συνηγοροι, and their fee το Συνηγορικον. No man was admitted to this office before he was 40 years of age, though others say 30. Valour in war, piety to their parents, prudence in their affairs, frugality, and temperance, were necessary qualifications for this office, and every candidate underwent an examination concerning these virtues previous to the election. The orators at Rome were not unlike the Athenian rhetores. See ORATOR.

RHETORIANS, a sect of heretics in Egypt, so denominated from Rhetorius their leader. The distinguishing tenet of this heresiarch, as represented by Philastrius, was, that he approved of all the heresies before him, and taught that they were all in the right.

RHETORIC, the art of speaking copiously on any subject, with all the advantages of beauty and force. See ORATORY.

RHETO'RICAL. *a.* (*rhetoricus*, Latin.) Pertaining to rhetoric; oratorical; figurative (*Brown*).

RHETO'RICALLY. *ad.* Like an orator; figuratively; with intent to move the passions.

To RHETO'RICATE. *v. n.* (*rhetoricor*, low Latin.) To play the orator; to attack the passions (*Decay of Piety*).

RHETORI'CIAN. *s.* (*rhetoricien*, Fr.) 1. One who teaches the science of rhetoric. 2. An orator (*Dryden*).

RHETORI'CIAN. *a.* Suiting a master of rhetoric (*Blackmore*).

RHEUM. *s.* (ρευμα.) See RHEUMA.

RHEUM. Rhubarb. In botany, a genus of the class ennecandria, order monogynia. Calyx-less; corol six-cleft, permanent; seed one, three-sided. Eight species, as follow.

1. R. rhaponticum. Common rhubarb. Large, thick, fleshy, branchy, deeply striking roots, yellowish within; stem strong, upright, two or three feet high; leaves obtuse, heart-shaped, glabrous, with the veins a little hairy underneath; petioles grooved above and rounded at the edge; flowers white on spikes. A native of Thrace.

2. R. palmatum. Palmated-leaved, or true Chinese rhubarb. Root thick, fleshy, yellow within; leaves palmate, pointed, roughish, with the cavity at the base dilated; petioles obsoletely grooved above, and rounded at the edge; stems upright, five or six feet high, terminated by large spikes of flowers; buds a dull red. A native of Tartary. The root furnishes the genuine officinal rhubarb; and is usually known in the pharmacopœias by the name of RHABARBARUM, which see for its medicinal properties. There are various other species of this genus, however, that possess the same properties to a less extent; and especially the preceding and two succeeding species.

3. R. undulatum. Wave-leaved Chinese rhubarb. Root thick, branchy, deep-striking, yellow within; leaves somewhat villous, undulate, with the cavity at the base dilated; petioles flat above and acute at the edge. A native of China and Siberia.

4. R. compactum. Thick-leaved, or compact rhubarb. Root as the last; leaves slightly lobed, very obtuse, lucid, sharply denticulate, quite glabrous; panicles nodding. A native of Tartary.

5. R. ribes. Warted-leaved Persian rhubarb. Root full of protuberances; leaves very obtuse, slightly warted, with the veins a little spinous underneath; petioles flat above and rounded at the edge; stem upright, firm, three or four feet high, succeeded by berry-like seeds surrounded by a purple pulp; a very singular plant; indigenous to Persia.

6. R. Tartaricum. Tartarian or heart-leaved rhubarb. Root fleshy; leaves heart-ovate, entire, flat, quite glabrous; petioles half round, angular, panicle grooved. A native of Tartary.

7. R. hybridum. Hybrid rhubarb. Leaves glabrous above, a little hairy beneath, slightly lobed, acute, with the cavity at the base nar-

rowed; petioles obsoletely grooved above, and rounded at the edge. A native of Asia.

8. R. leucorrhizum. Leaves transversely oval, depressed; panicle half inferior, divaricate; two of the leaflets of the calyx much larger than the rest. A native of Siberia.

These plants, which have all perennial roots, are propagated by seeds, which should be sown in autumn, soon after they are ripe, in the places where the plants are designed to remain. When the plants appear in the spring, the ground should be hoed over to cut up the weeds, and they should be thinned so as to stand at the distance of six or eight inches asunder. Let them be hoed a second time, and thinned to the distance of a foot and a half, or more, after which they will require no other culture but to be kept clean from weeds.

RHEUMA. (ῥευμα, from ῥεω, to flow.) The discharge from the nostrils or lungs arising from cold; hence the following lines of the school of Salernum:

Si fluit ad pectus, dicatur rheuma catarrhus,
Ad fauces branchus, ad nares esto coryza.

RHEU'MATIC. *a.* Pertaining to rheum; afflicted with rheumatism.

RHEUMATISM. (ῥευμαλισμος; from ῥευματιζω, to be afflicted with defluxions.) This term is so called from its being formerly used in the same sense as rheuma; but, in the present day, the meaning of this word is applied to a genus of diseases in the class pyrexiæ and order phlegmasiæ of Cullen; characterized by pyrexia, pains in the joints, increased by the action of the muscles belonging to the joint, and heat on the part. The blood, after venæsection, exhibits an inflammatory crust. Rheumatism terminates in arthrodynia, lumbago, and ischias. Rheumatism is distinguished into acute and chronic. The acute is preceded by shivering, heat, thirst, and frequent pulse; after which the pain commences, and soon fixes on the joints. The chronic rheumatism is distinguished by pain in the joints, without pyrexia, and is divided into three species; lumbago, affecting the loins; and ischias, or schiatica, affecting the hip, and arthrodynia, or pains in the joints. The acute species mostly terminates in one of these species.

RHEU'MY. *a.* (from *rheum.*) Full of sharp moisture.

RHEXIA, in botany, a genus of the class octandria, order monogynia. Calyx five-cleft; petals four inserted on the calyx; anthers declining; capsule four-celled, within the body of the calyx. Seven species; natives of America or the West Indies; some with leaves sessile, others with leaves petioled. The two following are cultivated.

1. R. Virginica. Virginian rhexia. Stem shrubby, with four membranaceous angles; leaves sessile, lanceolate, opposite; calyxes fringed with glands; flowers solitary, from the fork, red, with the petals heartshaped, spreading open in the form of a cross. A native of Virginia.

2. R. Mariana. Maryland rhexia. Stalk erect, ten inches high; leaves sessile, lanceolate; calyxes sprinkled with stellate hairs; flowers reddish, with heartshaped petals, as in the last. A native of Maryland.

Both are propagated by seeds from their native climates: they flower the second year, and with care continue for three or four years.

RHIANUS, a Greek poet of Thrace, originally a slave. He wrote an account of the war between Sparta and Messenia, as also an history of the principal revolutions and events which had taken place in Thessaly. He flourished about 200 years before the Christian era.

RHIBESIA. (from *ribes*, a currant.) See RIBES NIGRUM, RIBES RUBRUM, and FRUITS (Summer).

RHINÆUS. (from ῥις, the nose.) In myology. See COMPRESSOR NARIS.

RHINANTHUS. Rattle-grass. In botany, a genus of the class didynamia, order angiospermia. Calyx four-cleft, inflated; upper lip of the corol compressed; capsule two-celled, obtuse, compressed; seeds imbricate, flattish. Ten species, chiefly of the Cape, Levant, and Egypt; one, rhinanthus crista galli, common yellow rattle, a well-known weed indigenous to our own meadows.

RHINE, a great and remarkable river of Europe, which rises in Swisserland, in the canton of Grisons. It is formed of three streams; the Further Rhine from the head of the valley of Disentis; the Middle Rhine from the valley of Medelo, an appendage of St. Gothard; and the Hither or Upper Rhine from the mount Avicula. The first two torrents united is called the Lower Rhine, which receives the Upper Rhine, at Richenau; and the height is here about 6180 feet above the sea. Flowing by Coire, at the distance of a mile, the Rhine here becomes navigable for rafts. It is soon after the boundary between the Rheinthal and a territory of Austria, and passes through the lake of Constance from E. to W. Leaving this lake, it becomes the boundary between Swisserland and Suabia, flowing by Schaffhausen (below which it forms a celebrated cataract) to Basel. At Basel the river turns to the N. and flows thence to Holland; in which course it becomes the barrier between France and Germany, gives name to the two German circles of the Upper and Lower Rhine, waters many considerable cities and towns, and receives some large rivers. Below Emmerick, in the duchy of Cleve, it divides into two streams. That which bends to the W. and flows by Nimeguen, is called the Waal, but loses that name on its junction with the Meuse, at Worcum. Below Gorcum, it divides into four principal branches, forming the isles of Ysselmonde, Voorn, and Overflackee: the most northern branch is called the Merwe, and passing by Rotterdam and Schiedam, is joined by the branch from the S. side of Ysselmonde, and enters the German ocean, below Briel: the other two branches make their exit at Helvoetsluys and Goree;

The other stream which had branched off to the N.W. below Emmerick, retains its name; but below Huessen another branches off to the N. takes the name of Yssel, and enters the Zuider Zee, below Campen. The old river proceeds W. by Arnheim to Duerstede, when it again divides into two streams; that to the left is called the Leck, and enters the Merwe above Rotterdam. The branch to the right, which retains its name, passes on to Utrecht, where it divides once more, into two streams: the smaller one is called the Vecht, which runs N. into the Zuider Zee, at Muyden; and the other, the remains of the noble Rhine, flows W. by Woerden to Leyden, where it divides into several channels, and afterwards is lost among hills of sand near the village of Catwyck.

RHINE (Lower), a circle of Germany. It extended on both sides the Rhine, from the circle of Suabia, on the S. to that of Westphalia, on the N. containing the electorates of Mentz, Treves, and Cologne, the palatinate of the Rhine, the duchy of Westphalia, and the county of Lower Isenburg. But in 1801, the territories of this circle to the W. of the Rhine were ceded to France, and are included in the departments of Roer, Rhine and Moselle, Sarre, and Mont Tonnerre.

RHINE (Lower), a department of France, containing the late province of Lower Alsace. Strasburg is the capital.

RHINE (Upper), a department of France, containing the late province of Upper Alsace. Colmar is the capital.

RHINE (Upper), a circle of Germany. It extended across the Rhine, from the province of Loraine in France, on the S. to the circle of Lower Saxony, on the N. and was nearly intersected by the palatinate to the Rhine. It included the langravate of Hesse, Wetteravia, the counties of Catzenellenbogen and Waldeck; the imperial town of Frankfort, the bishoprics of Fulda, Spire, and Worms, and the duchy of Deux Ponts. But the territories of this circle on the W. side of the Rhine were ceded to France in 1801, and are included in the departments of Sarre and Mont Tonnerre.

RHINE (Palatinate of the), a late electorate of Germany, in the circle of Lower Rhine; bounded on the N. by the archbishoprics of Mentz and Treves, E. by Franconia, S. by Suabia, and W. by France. It was also called the Lower Palatinate, to distinguish it from the Palatinate of Bavaria, sometimes called the Upper Palatinate. But this electorate was suppressed in 1801; the French annexing the part W. of the Rhine to their own territory, and giving the remainder to the electors of Baden and Hesse.

RHINE AND MOSELLE, a new department of France, including part of the late electorates of Cologne and Treves, and of the late palatinate of the Rhine. The capital is Coblentz.

RHINEBERG, a town of Germany, in the circle of the Lower Rhine, and diocese of Cologne. It was in the possession of the French, but restored to the archbishop of Cologne by the treaty of Utrecht. It is seated on the Rhine. Lon. 6. 39 E. Lat. 51. 30 N.

RHINECK, a town of Germany, in the archbishopric of Cologne, seated on the Rhine, Lon. 7. 53 E. Lat. 50. 27 N.—There is another town of the same name in Swisserland, capital of Rhinthal, seated on the Rhine, near the lake of Constance, with a good castle. Lon. 9. 53 E. Lat. 47. 38 N.

RHINFELD, a small but strong town of Germany, in the circle of Suabia, and the best of the four Forest-towns belonging to the house of Austria. It has been often taken and retaken in the German wars; and is seated on the Rhine, over which there is a handsome bridge. Lon. 7. 53 E. Lat 47. 40 N.

RHINEGAU, a beautiful district of the electorate of Mentz, is situated on the Rhine, about three miles from the city of Mentz, and is so populous that it looks like one entire town intermixed with gardens and vineyards. The Rhine here grows astonishingly wide, and forms a kind of sea, near a mile broad, in which are several well-wooded little islands. The Rhinegau forms an amphitheatre, the beauties of which are beyond all description. See Riesbach's Travels through Germany, vol. iii. p. 226.

RHINFELS, a castle of Germany, in the circle of the Lower Rhine, in a county of the same name. It is looked upon as one of the most important places seated on the Rhine, as well in regard to its strength as situation. It is near St. Goar, and built on a craggy rock. This fortress commands the whole breadth of the Rhine, and those who pass are always obliged to pay a considerable toll. In the time of war it is of great importance to be masters of this place. Lon. 7. 43 E. Lat. 50. 3 N.

RHINLAND, a name given to a part of South Holland, which lies on both sides the Rhine, and of which Leyden is the capital town.

RHINGIA. In the entomology of Fabricius, a tribe of the dipterous genus CONOPS, which see.

RHINOCEROS. In zoology, a genus of the class mammalia, order bruta. Horn solid, perennial, conic, placed on the nose, not adhering to the bone. Two species, as follow.

1. R. unicornis. One-horned rhinoceros. This animal is among the largest of quadrupeds. His body equals the bulk of the elephant but not his sagacity: were his legs however less short, he would exhibit a no less stately figure. The single, black, smooth horn, sometimes three feet and a half long, which is situated near the extremity of the nose, constitutes his specific character. The upper lip is disproportionately large; hanging over the lower, and terminating in a point. It is furnished with muscles, which enable the animal to move it with great dexterity in collecting his food, and introducing it into the mouth. The nostrils are in a transverse direction. The ears

are large, erect, and pointed. The skin is naked, rough, and extremely thick. About the neck it is gathered into enormous folds: a fold extends between the shoulders and the fore legs, and another from the hinder part of the back to the thighs. The tail is slender, flat at the end, and covered on the sides with very stiff, black hairs. In consequence of the vast bulk of the body, and the disproportionate shortness of the legs, the belly hangs low. The breadth of the feet does not exceed the circumference of the legs.

This animal was perhaps known to the ancients. Several of the sacred writers make frequent allusions to the ראם or רים, *reem*, sometimes translated unicorn, sometimes rhinoceros, as familiarly known. They have not indeed condescended to a minute description; but the terms in which they have mentioned it, indicate this rather than any other animal. Pliny mentions the rhinoceros, as an animal that appeared in the Roman circus, in games exhibited by Pompey. He was opposed to the elephant, and shewed himself no unequal antagonist. In addition to this information, the Roman natural historian fables, that the elephant and the rhinoceros are natural enemies; and that the latter carefully whets his horn upon stones, to tear up the belly of the former. Though not described by Aristotle, the rhinoceros is mentioned by the historians of Alexander, as one of the strange animals discovered by his army in their progress into India.

But from the time when they ceased to be exhibited on the Roman amphitheatres, till within the sixteenth century, no animals of this species appeared in Europe. It was forgotten that any had ever been seen. Those who were acquainted with what the ancients relate concerning the rhinoceros concluded, or at least suspected, either that no such species of animals had ever existed; or, that though they might have existed once, they had become extinct.

In the sixteenth century, the reality of this animal was fully ascertained. A number of individuals have since been, at different times, introduced into Europe. Many figures have been drawn; and the form of the rhinoceros is no longer strange. His character and manners are also tolerably known.

He is a native inhabitant of Bengal, Siam, Cochinchina, Quangsi in China, and the isles of Java and Sumatra. He is a solitary, stupid animal. Shady forests adjoining to rivers, and miry, marshy plains, are his favourite haunts. Unless provoked by injuries, he is commonly mild and inoffensive. His rage is desperate and dangerous, and when violent he will overturn trees. He urines and copulates backwards. The female produces only one at a birth. During the first month of its age, the young rhinoceros does not rise above the size of a large dog. The horn is at first almost imperceptible, and increases by slow gradations. The bulk of the animal is indeed but very slowly enlarged. At the age of two years he has scarce attained half his full height. His eyes are small, and his sight dull. But he possesses the senses both of hearing and smelling in high perfection. Thorns and prickly shrubs are his chief food. His tongue was once said to be rough and hard; but from later and more accurate observation, we learn, that it is as smooth and soft as the tongue of any animal. It has been conjectured, that sixty or seventy years may be the natural term of the life of the rhinoceros. His skin has been represented as impenetrable, even by balls; but we now find that this vast animal is liable to be mortally wounded by missile weapons of all kinds, though extremely hard and resisting.

The flesh is not unlike pork; but of a coarser grain, and a stronger taste: in his voice he also resembles the hog, as well as in his general manners. The horn is hairy at the base, acute, fibrous, frequently three feet long; teeth while young straggling, remain solitary; when old completely shed: tail tapering, shorter than the feet.

2. R. bicornis. Two-horned rhinoceros. Horns two. In size, form, manners, and almost all other characteristics, this species appears nearly allied to the former. The only, or at least the chief distinction is in the additional horn: the second standing straight behind the first. We know not whether the unicorn and the bicorn copulate and breed together indifferently. It has even been doubted, whether all animals of the rhinoceros character may not naturally possess two horns; and an unicorn appear only in consequence of an accidental loss.

The anterior horn is always larger than the posterior. Both are of a conical shape, with the tips somewhat reclining. The posterior horn of an old rhinoceros has always the appearance of being worn away. Sparrman relates from the information of the Hottentots and Dutch colonists at the Cape, that the horns are remarkably loose on the nose of the living rhinoceros; that the animal moves them backwards and forwards at pleasure; that as he walks carelessly, they shake and clatter against each other; and in digging roots, which he eats, as well as prickly shrubs, that he reclines the anterior horn, and employing only the posterior, thus wearing the latter by degrees to a stump, while the former remains entirely uninjured. The tips of both horns are slightly bent backward. Their texture seems composed of parallel horny fibres. Near the root, the surface of the horn is rough and unequal; towards the point smooth and plain like the horns of oxen. The anterior horn of a bicorn rhinoceros of moderate size shot by Dr. Sparrman was a foot in length, and five inches in circumference at the base. The anterior horn of a larger rhinoceros was a foot and an half in circumference, and seven inches in circumference at the base. The posterior horn stands rather on the forehead than on the snout.

Dissecting the smaller rhinoceros, Sparrman found its stomach filled with masticated roots

and branches of trees, and succulent plants, several of which seemed to be prickly. It had no fore-teeth; but the lips were of so hard a texture, that they might easily serve to perform all the functions of the fore-teeth of other animals. The jaws of a full grown rhinoceros were furnished with four and twenty grinders. The anterior part of the os palati exhibited a tooth-like process; but so distant from the lower jaw, that it could scarcely serve any of the purposes of a tooth. The skin is hard, and thick in proportion to the bulk of the animal; but not proof against pointed or missile weapons. On the feet, the skin is thicker, and more callous than on the other parts. The skin is not gathered into folds, as that of the former species. It is smooth and flesh-coloured between the legs: a few stiff bristles are thinly scattered over the other parts of the body; they are most numerous about the ears and the end of the tail. The skin is of a deep cinereous grey colour, embossed with numerous warts that appear all over the body. The foot is divided into three parts, the hoofs of which project but a little beyond the leg. The Abyssinian bicorn appears to be in some respects different from this of the Cape. Bruce represents him as having his skin gathered into folds, on the neck, the shoulders, the buttocks, and some other parts of his body. His mouth he describes as furnished with twenty-eight teeth. The upper lip he allows to be remarkably large. The skin is always smooth, except when flies and other troublesome insects have broken it, so as to produce pustules; a distress to which the animal is very liable. The tongue of the young rhinoceros is smooth; but, as he grows old, it becomes very rough. The anterior horn is round, and bends slightly back at the point; behind it appears the second, which is flat and straight.

It is only in Africa that this animal has been discovered alive in modern times. In the southern parts of the African continent, the species are well known. The Europeans who have penetrated into Abyssinia represent them as not less numerous in that country. From an epigram of Martial, and some coins of Domitian, we learn that the rhinoceros with two horns was not unknown to the Romans.

The manners and œconomy of this species differ but little from those of the last. But the bicorn has been more accurately observed than the unicorn. He resides almost constantly in deep forests. He never eats hay or grass. Large succulent plants, prickly shrubs, the branches, and even the trunks of trees, are the articles of food which he prefers. The strength of his jaws and teeth enables him to break off and masticate the thickest branches of the hardest and toughest trees. But the forests of Abyssinia afford trees of a softer consistency, and peculiarly succulent; which he eats in preference to others. His upper lip is his chief instrument in collecting his food. He extends and twists it, so as to perform with it many of the functions which the elephant performs with his proboscis. After stripping a tree of its branches, a rhinoceros often applies his horn to the trunk, and splitting it into so many lathes, devours it with as much ease and avidity, as an ox would eat up a bunch of celery. In the forests inhabited by animals of this species, there appear not unfrequently trees divested of their leaves and branches,—sometimes a trunk divided into lathes, a part of which has been eaten, and another part left for a future repast,—and sometimes short stumps, of which the leaves, branches, and trunks have been devoured. The horns of the rhinoceros suffer greatly however at times in procuring his food; he often leaves a part of a horn either fixed in a tree, which he has in vain attempted to tear, or lying beside it on the ground. The sensibility of the rhinoceros in this part must render such an accident as the breaking of a horn, if not fatal, at least extremely painful and dangerous. Bruce relates that he saw a rhinoceros so affected, on having the point of his foremost horn broken off by a musket ball, as to appear, for an instant, absolutely incapable of sense and motion.

However unwieldy his form, the rhinoceros displays astonishing swiftness. He moves with a sort of trot; quickening his pace by degrees, as he runs. His speed is not equal to that of a swift and vigorous horse; but, between speed and cunning, he seldom suffers a hunter, mounted on horseback, to overtake him. The Hottentot and Caffrarian hunters are accustomed to steal upon the rhinoceros when asleep, and gore him with several deep wounds. After which, they follow his footsteps, even for several days, till he drops down of weakness, or dies of his wounds. But according to Sparrman they commonly poison their darts immediately before the enterprize: and in this case, the animal does not long survive. As he moves through the forest, the trees are crushed under his weight, like so many dry reeds. His eyes are so small, and his sight so feeble, that he sees only a very short way before him. The Abyssinians pursue him, two on a horse; and, as he seldom looks behind him, commonly overtake him before he is aware. The one, armed with a sword, then drops down; and cutting the hams of the rhinoceros, the vast animal falls to the ground, alike incapable of flight and of resistance. Although naturally peaceable, he is disposed, like the unicorn, to defend himself with great fury when attacked. His rage is impetuous, but generally ill directed; he injures himself as readily as his antagonist; and knocks his head against a wall or manger, or strikes against a tree with as much satisfaction as against the hunter who attacks him.

It may be naturally conceived, that so large an animal as the rhinoceros must require a considerable quantity of water to macerate his food. The tracts of country which he inhabits are interspersed with marshes, lakes, and rivers. The district of the Shangalla, the favourite abode of this species, in Abyssinia, is, for six months in the year, deluged by constant rains, and overspread with woods which prevent evaporation. This species of rhino-

ceros is peculiarly pestered by flies, in consequence of being destitute of hair. Nature has taught him, however, to roll occasionally in the mire, till he acquire a crust of dirt, which may for a time at least protect him from their stings. But this dries, cracks, and falls off in pieces. The flies then renew their attacks, and often pierce his skin; so that his body is at length covered over with pustules. It is in the night chiefly, that he rolls in the mire; and the hunters often steal on him at that period, while he is enjoying one of his favourite pleasures, and stab him with mortal wounds in the belly, before he is aware of their approach. By wallowing in the mire, though he loses the flies, he often gathers worms and other insects upon his body; such as millepedes, scolopendræ, worms and snails.

The rhinoceros, though next in size, yet in docility and ingenuity is greatly inferior to the elephant, and has never been tamed, so as to assist the labours of mankind, or to appear in the ranks of war. The Romans introduced him on the amphitheatre, and opposed him to the elephant; it is even pretended, that he appeared no unequal match. The bear was a contemptible antagonist to the rhinoceros. The flesh of this animal, though by no means a delicate dish, is with the Shangalla, and a great part of the inhabitants of Lower Abyssinia, a principal article of food. The soles of his feet, consisting of a gristly substance, soft like the soles of a camel, are the most delicate part. The rest of the flesh is said to taste like pork; but is much coarser, and smells of musk. The negro hunters of Abyssinia eat it without salt. The hairs about the tail are so thick and strong, that with ten of them a whip may be made, which will draw blood at every stroke. The skin cut into thongs forms excellent whips. The horns are made into cups, which have been fancied to act as antidotes against poison. In Abyssinia, the handles of daggers are always made of the horn of the rhinoceros. The second horn is scarce ever applied to any use. The surface is susceptible of a perfect polish; and beautiful snuff-boxes might be formed of this material, were it not that it is a substance easily scratched, and extremely liable to crack or splinter.

This animal has been sometimes found with a third horn, the last being probably nothing more than an excrescence on one of the others.

Pallas affirms that the bones of the rhinoceros have been often found buried in the north of Russia. But neither species have been discovered there in a living state.

RHINOCEROS BIRD. See BUCEROS.

RHINOMACER, in zoology, a genus of the class insecta, order coleoptera. Antennas setaceous, seated on the snout; feelers four, growing thicker towards the end, the last joint truncate. Three species; natives of Europe; two of them resembling the curculio; one probably a species of attelabus.

RHIPHÆI, large mountains merely supposed to exist at the north of Scythia, where the Gorgons had fixed their residence. The name of Rhiphæan was applied to any cold mountain in a northern country.

RHIZOBOLUS, in botany, a genus of the polyandria tetragynia class and order. Essential character: calyx, half five-cleft; petals five; germ four-lobed, superior; nuts four, one-celled, one-seeded. There are two species, viz. rhizobolus butyrosus, and rhizobolus tuberculosus, both natives of Guiana.

RHIZOMORPHA, in botany, a genus of the class cryptogamia, order algæ. Frond much branched, creeping, horny or woody, concealing the fructification. Five species, all indigenous plants, black, blackish brown, dark chesnut brown, or dull saffron brown.

RHIZOPHORA. Indian kandel tree. Mangrove. Mangle. In botany, a genus of the class dodecandria, order monogynia. Calyx four-parted; corol four-parted; seed one, very long, fleshy at the base. Five species. All these grow only in water or the muddy rivers of Asia, Africa, and America, under the tropics, bending their branches perpendicularly to the ground, and changing them into stems penetrating into the soil and giving forth rootlets.

The most curious of the tribe is rhizophora mangle. Proper mangrove or mangle-tree. A native of the Indies, with acute leaves, and fruit subulate and clavate. The rootlets from the branches of this tree are so productive of new suckers which bend down constantly after they have reached a certain height, that a single tree is often found to cover more than a mile of ground with a forest consisting of innumerable stems, which at the top have the appearance of a close clipped bower, and in its various intervals forms a multiplicity of natural arcades from five to ten feet high; while the horizontal branches are so closely interwoven as to form a kind of natural and transparent terrace, raised with such solidity over the water, that were it not for the prodigious quantity of leaves, a man might readily walk upon them.

The bark of this tree is brown and smooth, pliant when green, and often used for tanning leather. The wood is used chiefly for fuel, and affords a brighter and more ardent fire than wood of any other kind.

The timber is extremely close-grained, and consequently enormously heavy, which prevents it from being generally employed for mechanical purposes, which it otherwise would be to a very great extent, since it never splinters, and is almost incorruptible. Oysters very generally attach themselves to the branches of these trees as they hang over and plunge into the water; so that they may often be said with great truth to be gathered upon trees.

There are two other varieties of this tree, the red-mangle, which grows on the sea-side, but does not advance into the water; and the white-mangle, denominated like the last from the colour of its wood; and like the last also fond of the sea-side, but not of the water itself. The bark of this last is twisted into ropes of all sizes, which are exceedingly strong, and not apt to rot in the water.

RHODE ISLAND, one of the United

States of America, bounded on the N. and E. by Massachusets, on the S. by the Atlantic, and on the W. by Connecticut. These limits comprehend what has been called Rhode Island and Providence Plantations. It contains five counties, and 29 townships. It is as healthful as any part of N. America, and is principally a country for pasture. Providence and Newport are the chief towns.

RHODE ISLAND, an island of N. America, in a state of the same name. It is 13 miles long and four broad, and divided into three townships. This island is a noted resort of invalids from the southern climates, being exceedingly pleasant and healthful, and is called with propriety the Eden of America.

RHODES, an island of the Mediterranean, on the S. side of Natolia, 40 miles long and 15 broad. The air is good, and the soil pretty fertile, but badly cultivated. The principal town, of the same name, is an archbishop's see, and has a good harbour, with a narrow entrance between two rocks, on which are two towers to defend the passage. Here, in all probability, stood the famous Colossus, a statue of bronze, 70 cubits high, reckoned one of the seven wonders of the world: it was thrown down by an earthquake; and when the Saracens became masters of this island in 665, they knocked it to pieces, with which they loaded 900 camels. The knights of Jerusalem took Rhodes from the Saracens in 1309, and kept it till it was taken from them by the Turks, in 1623. It is looked upon as an impregnable fortress, being surrounded by triple walls and double ditches. It is inhabited by Turks and Jews; for the Christians are obliged to live in the suburbs, they not being suffered to be within the walls in the night-time. Lon. 28. 25 E. Lat. 36. 24 N.

RHODEZ. See RODEZ.

RHODIA. (ῥοδία; from ῥοδον, a rose; so called because its root smells like the damask rose.) The radix rhodiæ of some pharmacopæias, is the produce of the rhodiola rosea of Linnæus, called rose-wort. When dry, it has a very pleasant smell, resembling that of the damask rose. In this odorous matter the medical virtue of the root resides. Poultices in which this root enters as a chief ingredient, are said to allay violent pains of the head.

RHODIOLA. Rose-root. Rose-wort. In botany, a genus of the class dicœcia, order octandria. Calyx four-parted; petals four; nectaries four, emarginate. Female: pistils four; capsules four, many-seeded. One species, with a thick, fleshy root, which when cut emits an odour like that of roses; the root has many heads, whence in the spring issue a multitude of stalks about nine inches long, succulent, and surrounded with fleshy leaves, alternate and indented on the edge; flowers in clusters, terminal, yellowish; appear in May; of an agreeable scent, but of short continuance. It is found wild on the Alpine rocks; and is cultivated, and increased by planting cuttings of the stalks in the beginning of April; or by parting the roots in the autumn.

RHODIUM, in mineralogy, one of the metals lately discovered by Dr. Wollaston in crude platina: for the mode by which it may be procured, see the article PLATINUM.

It is of a white colour: specific gravity something more than 11. No degree of heat hitherto applied is capable of fusing it. We do not know therefore whether it be malleable: but as it forms malleable alloys with other metals, it is probable that it would not be destitute of malleability if it could be fused into a button.

The following are the results of the experiments made by Dr. Wollaston to alloy rhodium with other metals.

"It unites readily with all the metals that have been tried, except mercury; and with gold and silver it forms very malleable alloys, that are not oxydated by a high degree of heat, but become incrusted with a black oxyd when very slowly cooled.

"When four parts of gold are united with one of rhodium, although the alloy may assume a rounded form under the blowpipe, yet it seems to be more in the state of an amalgam than in complete fusion. When six parts of gold are alloyed with one of rhodium the compound may be perfectly fused, but requires far more heat than fine gold. There is no circumstance in which rhodium differs more from platina than in the colour of this alloy, which might be taken for fine gold by any one who is not very much accustomed to discriminate the different qualities of gold. On the contrary, the colour of an alloy containing the same proportion of platina differs but little from that of platina.

"When I endeavoured," continues Dr. Wollaston, "to dissolve an alloy of silver or of gold with rhodium, the rhodium remained untouched by either nitric or nitro-muriatic acids; and when rhodium had been fused with arsenic or with sulphur, or when merely heated by itself, it was reduced to the same state of insolubility. But when one part of rhodium had been fused with three parts of bismuth, of copper or of lead, each of these alloys could be dissolved completely in a mixture of two parts, by measure, of muriatic acid with one of nitric. With the two former metals the proportion of the acids to each other seemed not to be of so much consequence as with lead; but the lead appeared on another account preferable, as it was most easily separated when reduced to an insoluble muriat by evaporation. The muriat of rhodium had then the same colour and properties as when formed from the yellow oxyd precipitated from the original salt."

RHODIUM LIGNUM. (ῥοδιον; from ῥοδον, a rose, a wood which smells like roses.) Rhodium, or rose wood. The wood or root of a tree supposed to be the genista canariensis; foliis ternatis, utrinque pubescentibus; ramis angulatis of Linnæus. It is brought from the Canary islands in long crooked pieces, full of knots, externally of a whitish colour, internally of a deep yellow, with a red cast. The largest, smoothest, heaviest, and deepest co-

loured pieces should be chosen. Rose wood has a slightly bitterish, somewhat pungent, balsamic taste, and a fragrant smell, especially when scraped or rubbed, resembling that of roses. An essential oil is obtained from it, which is used principally as a perfume, but possesses cordial and corroborant virtues.

RHODODENDRON, in botany, a genus of the class decandria, order monogynia. Calyx five-parted; corol somewhat funnel-form; stamens declined; capsule five-celled. Ten species; chiefly natives of the Alps or of Siberia; one or two indigenous to America. The following are cultivated.

1. R. ferrugineum. Rusty-leaved rhododendron. Stalk shrubby, three feet high; branches irregular; bark purple; leaves glabrous, beneath leprous, ferruginous; umbels terminal; corol funnel-form, declined, the two lower petals narrower; of a pale rose-colour. A native of Swisserland; flowers from May to July.

2. R. hirsutum. Hairy rhododendron. Two feet high; branches woody, short, covered with a light brown bark; leaves elliptic, rather acute, ciliate, dotted underneath; corols funnel-form.

3. R. chamæcistus. Dwarf rhododendron, or rose-bay. Small shrub, very ramous, extreme branches leafy; leaves elliptic, rather acute, glandular-ciliate, naked: corols wheel-shaped; petals obtuse, of a purple hue. A native of Austria.

4. R. ponticum. Purple rhododendron. Trunk upright, shrubby, about the height of a man, sometimes less, irregularly ramous from the bottom; wood white; bark ash-colour; leaves oblong, glabrous, uniform in colour; corymbs terminal; corols campanulate, wheel-shaped; petals lanceolate. A native of the Levant: flowers in May and June.

5. R. maximum. Broad-leaved rhododendron. Shrub fifteen or sixteen feet high in its native soil; branchy towards the top; leaves oblong, glabrous, differently coloured underneath; umbels terminal; corols wheel-shaped; petals roundish. A native of North America.

6. R. chrysanthemum. Shrub less tall than the preceding; leaves oblong, rough, differently coloured and glabrous underneath; corols wheel-shaped; petals obovate, irregular. A native of Siberia. This was first recommended by Koelpin as an efficacious medicine, not only in rheumatism and gout, but even in venereal cases; and it is now very generally employed in chronic rheumatisms. The leaves, which are the part directed for medicinal use, have a bitterish subadstringent taste. Taken in a large dose, they prove a narcotic poison; and, in moderate doses, they are said to occasion heat, thirst, a degree of delirium, and a peculiar sensation of the parts affected.

All these are propagable by seeds, which should be sown soon after they are ripe, in pots filled with fresh loamy earth. The pots should be covered in hard frost with bell or hand glasses. They may also be propagated by cuttings or partings of the roots, and should have a loamy soil. See Nat. Hist. Pl. CXLII.

RHODIUS (John), an eminent physician, born at Copenhagen in 1587. He published Notes on Scribonius Largus, and other works, and died at Padua in 1659.

RHODOMAN (Laurentius), born at Sassowerf, in Upper Saxony, in 1546. He translated into Latin Diodorus Siculus, and some other works. He died in 1606, while professor of history in the university of Wittemberg.

RHODOPE, a high mountain of Thrace, extending as far as the Euxine sea. Rhodope, according to the poets, was the wife of Hæmus, king of Thrace, who was changed into this mountain, because she preferred herself to Juno in beauty.

RHODORA, in botany, a genus of the class decandria, order monogynia. Calyx five-toothed; corol three-petalled; stamens declined; capsule five-celled. A Canadian shrub, with elliptic, entire leaves, and umbelled flowers.

RHŒA. See Rhea.

RHOEADEÆ, in botany, the name of the twenty-seventh order in Linnéus's Fragments of a Natural Method, consisting of the poppy, and a few genera which resemble it in habit and structure. The plants, in this order, upon being cut, yield plentifully a juice which is white in the poppy, and yellow in others. See Poppy.

RHOMB SPAR, in mineralogy, a species of the calx genus, of a greyish colour passing to yellow: it is never massive, but always in regular, middle-sized rhombs; the lustre is splendent, and between vitreous and pearly; it is brittle, easily frangible; specific gravity 2.5; it is infusible, without addition. With acids, it produces very little effervescence, even when pulverized. Constituent parts:

Carbonate of lime.....	52
Carbonate of magnesia.....	45
Oxyd of iron and manganese....	3
	100

It is found in Swisserland, Sweden, and in chlorite rocks, on the banks of Loch Lomond in Scotland.

RHOMBOIDES, in geometry, a quadrilateral figure, whose opposite sides and angles are equal, but is neither equilateral nor equiangular.

RHOMBOIDEUS. (from ῥομβος, a geometrical figure whose sides are equal, but not right-angled, and εἶδος, resemblance.) In myology. Rhomboideus major and minor. This muscle, which is so named from its shape, is situated immediately under the trapezius. We find it usually, though not always, divided into two portions, which Albinus describes as two distinct muscles. The uppermost of these, or rhomboideus minor, arises tendinous from the spinous process of the three inferior vertebræ of the neck, and from the ligamentum colli; the lowermost, or rhomboideus major, arises ten-

Rhododendron Caucasicum.

Caucasian Rhododendron.

Smilacina Borealis.

Northern Borealis.



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dinous from the spinous processes of the back: the former is inserted into the basis of the scapula, opposite to its spine; the latter into all the basis of the scapula, below its spine. Its use is to draw the scapula obliquely upwards, and directly backwards.

RHOMBUS, in geometry, an oblique-angled parallelogram, or a quadrilateral figure, whose sides are equal and parallel, but the angles unequal, two of the opposite ones being obtuse, and the other two acute. To find the area of a rhombus, upon the base, let fall the perpendicular, which is the altitude of the figure; then multiply the base by the altitude, the product will be the area.

RHONE, a large river of Europe, which rises in Swisserland, from the glacier of Furca, between the two rocky mountains of Gletcherberg and Satzberg. Crossing the Vallais, it runs through the lake and city of Geneva, and separating France from Savoy, it flows to Lyons, Vienne, Tournon, Valence, Viviers, Pont St. Esprit, Avignon, Beaucaire, Tarascon, and Arles, and falls into the Mediterranean, by several mouths.

RHONE (Mouths of the), a department of France, containing part of the late province of Provence. Aix is the capital.

RHONE AND LOIRE, a department of France, including the late provinces of Forez and Lyonois. The capital is Lyons.

RHOPALA. See RUPALA.

RHUBARB. See RHEUM, and RHABARBARUM.

RHUMB, in navigation, a vertical circle of any given place, or intersection of such a circle with the horizon; in which last sense rhumb is the same with a point of the compass.

RHUMB-LINE is also used for the line which a ship describes when sailing in the same collateral point of the compass, or oblique to the meridians. See NAVIGATION.

RHUS. Sumach. In botany, a genus of the class pentandria, order trigynia: calyx five-parted, inferior; corol five-petalled; berry one-seeded. Thirty-four species scattered over the globe, but chiefly plants of the Cape. They may be thus subdivided:

A. Leaves pinnate.

B. Leaflets three together.

C. Leaves simple.

The following are cultivated:

1 R. coriaria. Elm-leaved sumach. Stem strong and woody, eight or ten feet high; bark hairy, and of an herbaceous brown while young; leaves pinnate; leaflets elliptic, obtusely toothed, villous underneath; flowers whitish, in large, branched spikes. A native of the south of Europe.

The branches are used instead of oak-bark for tanning leather, and it is said that the Turkey leather is uniformly tanned with this shrub. The leaves and seeds are used as styptics and astringents in medicine.

2. R. Typhinum. Stag's horn. Virginian sumach. Leaves pinnate, leaflets lanceolate, pointed, sharply serrate, downy beneath: the young branches covered with a velvet down, resembling a young stag's horn in colour and texture, whence its specific name: flowers of a beautiful purple, in close tufts at the end of the branches. A native of Virginia.

Vinegar is often made from the germs of the fruit; and its ripe berries afford an agreeable acid that may be used as a substitute for the citric: whence it is sometimes named vinegar plant.

Like the last, it is powerfully astringent; and hence, boiled with alum it makes a good dye for hats; with other ingredients it will give a good green or yellow; and with copperas will yield ink. The milky juice that flows from incisions in the trunk or branches makes, when dried, the basis of a varnish little inferior to the Chinese. The Americans use the dried leaves as tobacco.

3. R. glabrum. Scarlet sumach. Less lofty than the last: branches spreading and smooth; leaves pinnate, lanceolate, serrate, naked on both sides; flowers hermaphrodite, of an herbaceous colour. A native of North America.

4. R. elegans. Carolina sumach. Seven or eight feet high, branching irregularly; leaves pinnate, lanceolate, serrate, naked both sides; flowers dicœcous, of a bright red hue, in large, close, thick panicles. A native of South Carolina.

5. R. copallinum. Lentiscus-leaved sumach. Four or five feet high, branchy; leaves pinnate, very entire; petiole membranaceous, jointed; flowers panicled at the end of the branches, of a yellowish herbaceous colour. North America.

6. R. Cotinus. Venice sumach. A branchy shrub, four or five feet high; leaves simple, obovate; leaflets rounded on long footstalks; flowers in purplish bunches. A native of the Appenines.

The root is used for dyeing; the leaves and young branches dye a good black, and the bark is employed for tanning Spanish leather.

7. R. Toxicodendron. Trailing poison oak, or sumach. Branches slender, but woody; bark brown; leaves ternate; leaflets petioled, angular, pubescent; stem rooting; flowers dicœcous. North America.

8. R. vernix. Varnish sumach. Trunk straight; leaves pinnate, very entire, annual, opake; petioles entire, equal; flowers in a racemed spike, small, herbaceous; fruit juiceless drupe. A native of the swamps of North America.

This shrub distils by incision a juice employed in the Japan varnish; it is also extremely poisonous, but has been employed medicinally in paralysis and herpetic affections. Dr. Fresnoi was the first who attempted its use in these diseases; and in order that others should not suffer by his experiments, he began upon himself by taking an infusion of one of the three leaflets of which each leaf consists; and as this dose produced no sensible effect, he increased the number to twelve. His urine and perspiration were increased in quantity, and he had some pains in his belly. He relates seven cases, in which he thinks he can remove

all doubts of the efficacy of this infusion, in herpetic affections. From these the following are selected:

"A country woman, (says Dr. Fresnoi), came to me in the month of July 1780, to consult me about the herpes farinosa, with which her face had been covered for more than a year. She was ordered to make an infusion of this plant; and in six weeks was entirely free from the disease."

He likewise relates five cases of paralysis, which were cured by the use of this plant.

The leaves of this plant are to be cut when in the greatest vigour, about the month of June. "Those who cut this plant (observes Dr. F.), wear leathern gloves, on account of its poisonous qualities." The same gentleman observes, he saw one case in which inflammation of the eye-lids was produced by the vapour from the plant. Four pounds of the leaves being distilled with thirty-two pounds of water, gives it a slight odour, although the plant is entirely free from it. Its taste is pungent, and inflames the mouth. The dedoction which remains in the still is brown, and is generally covered with a light brown pellicle. When strained and evaporated, it gives a shining black extract. The leaves inflame and swell the hands and arms of those who take them out of the still, and brings on an itching, which remains for several days. Forty-two pounds of the leaves afford twenty ounces of extract, of a proper consistence for pills.

"A girl, in Flanders, (says Dr. Fresnoi), already subject to fits, laid down some flowers in her bed-room. Next day she told me, that she had undergone a great change; that she had had no fits, and slept much better. It occurred to me, (says Dr. F.), that the flowers occasioned this change. Next day, the flowers being removed, and the window opened, the convulsions reappeared; on their being again introduced, the fits disappeared; which proved plainly it was the effect of the flowers. The success of the extract in tussis convulsiva exceeded my hopes; forty-two children being cured of this disorder in Valenciennes during the end of the year 1786. Four grains of extract dissolved in four ounces of syrup, of which one table-spoonful given to the child every third hour, generally abates the cough, and mostly leaves them."

9. R. radicans. Rooting poison oak. A trailing shrub, with leaves ternate, ovate-heart-shaped; leaflets petioled, ovate, naked, very entire; stem rooting; flowers dicœous, small, herbaceous. North America. Sometimes called creeping ivy.

When the stem is cut, it emits a pale brown juice of a disagreeable scent, and so acrid that letters or marks made with it upon linen cannot be got out, but grows blacker the more it is washed.

It is poisonous like the preceding, but in a less degree.

10. R. tomentosum. Woolly-leaved sumach. Stalk woody, seven or eight feet high; leaves ternate; leaflets slightly petioled, rhombic, angular, downy beneath; flowers in slender bunches, of a whitish herbaceous hue. A native of the Cape.

11. R. angustifolium. Narrow-leaved sumach. Leaves lanceolate; in other respects very nearly resembling the preceding. A native of the Cape.

12. R. lucidum. Shining sumach. Stalk woody, branchy; leaves ternate; leaflets lucid, green, sessile, wedge-form, even. A native of the Cape.

The first nine may be raised by seeds or layers, and some of them by suckers, or by their rooting branches; the seeds should be procured from abroad. The seventh and ninth may be propagated by their trailing branches which have stricken root as they trail on the ground.

RHUS BELGICA. The Dutch myrtle is sometimes so termed. See MYRTUS BRABANTICA.

RHUS COBBE, in botany. See SCHMIDELIA.

RHYAIDERGOWY, a town in Radnorshire, with a market on Wednesday. Its name signifies the Fall of the Wye, that river being here precipitated in a cataract. It is 20 miles W.N.W. of New Radnor, and 177 of London. Lon. 3. 27 W. Lat. 52. 17 N.

RHYAS. (ῥοιας or ῥυας, a disease of the eye.) A decrease or defect of the lachrymal caruncle. The proximate cause is a native defect; or it may originate from excision, erosion, or acrimony. This disorder is commonly incurable, and it induces an incurable epiphora, or a continual weeping.

RHYME, RHIME, RYME, or RIME, in poetry, the similar sound or cadence and termination of two words which end two verses, &c. Or rhyme is a similitude of sound between the last syllable or syllables of a verse, succeeding either immediately or at a distance of two or three lines. See POETRY.

RHYMER (Thomas the), was a native of the parish of Earlstown, in the county of Berwick. His real name and title was sir Thomas Lermont. He lived at the west end of Earlstown, where part of his house is still standing, called Rhymer's Tower; and there is a stone built in the fore wall of the church with this inscription on it "Auld Rhymer's race lies in this place." He lived in the 13th century, and was contemporary with one of the earls of March, who lived in the same place.

RHYME *or reason*. Number or sense (*Spenser*).

To RHYME. *v. n.* 1. To agree in sound (*Dryden*). 2. To make verses (*Shakspeare*).

RHY'MER. RHY'MSTER. *s.* (from *rhyme*.) One who makes rhymes; a versifier; a poet in contempt (*Shakspeare*).

RHYPTICS. (ῥυπτικα, from ῥυπτω, to cleanse.) Medicines which cleanse foulnesses.

RHYTHM, RHYTHMUS, Ῥυθμος, in music, the variety in the movement, as to the quickness or slowness, and length and shortness, of the notes.

Or the rhythmus may be defined, more generally, the proportion which the parts of a motion bear to each other.

Aristides, among the ancient musicians, applies the word rhythmus three ways; viz. either to immoveable bodies, when their parts are rightly proportioned to each other, as a well-made statue, &c. or to things that move regularly, as in handsome walking, in dancing, in the dumb shews of the pantomimes, &c. or, thirdly, to the motion of sound, or the voice; in which, the rhythmus consists of long and short syllables, or notes, joined together in succession in some kind of order, so that their cadence on the ear may be agreeable.

This, in oratory, constitutes what we call a numerous style; and when the tones of the voice are well chosen, a harmonious style.

In effect, rhythmus, in the general, is perceived either by the eye or ear, and may be either with or without metre: but the strict musical rhythm is only perceived by the ear, and cannot exist without it. The first either exists without sound, as in dancing; or with sounds: it may be either without any difference of acute and grave, as in a drum, or with a variety of these, as in a song.

The rhythmus of the ancients, Mr. Malcolm observes, was very different from that of the moderns. The former was only that of the long and short syllables of the words and verses; it depended altogether on the poetry, and had no other forms or varieties than what the metrical art afforded. The changes therein are none but those made from one kind of metre to another, as from iambic to choraic, &c.

In the modern music, the constitution of the rythmus differs from that of the verse, so far, that in setting music to words, the thing chiefly regarded is to accommodate the long and short notes to the syllables in such manner, as that the words be well separated, and the accented syllable of each word so conspicuous, that what is sung may be distinctly understood.

Vossius, in his book De Poematum Cantu & Viribus Rhythmi, extols the ancient rhythmus. Though he owns it was confined to the metrical feet; yet so well did they cultivate their language, especially in what relates to the rhythmus, that the whole effect of the music was ascribed to it, as appears by that saying of theirs, το παν παρα μουσικοις ρυθμος. See, on this subject, Burney's General History of Music, vol. i. sect. 6. See also Calcott's Musical Grammar, Part iv.

RHYTHM, RHYTHMUS, in the ancient poetry, denotes the measure of the feet, or the number and combination of long and short syllables; called also metre and quantity.

Vossius attributes the whole force of the ancient music to their happy rythmus: but this is somewhat inconceivable. Mr. Malcolm rather takes it, that the words and sense of what was sung had the chief effect; and that hence it was that in all ancient music the greatest care was taken that not a syllable of the words should be lost, lest the music should be spoiled.

Pancirollus seems of this opinion: and the reason he gives why the modern music is less perfect than the ancient is, that we usually hear sounds without words.

RHYTHMICA, RHYTHMICE, Ρυθμικη, in the ancient music, that branch of music which regulated the rhythmus. The rhythmica considered the motions; and regulated their measure, order, mixture, &c. so as to excite the passions, keep them up, augment, diminish, or allay them.

Aristides, and other ancient musical writers, divided artificial music into harmonica, rhythmica, and metrica.

But the rhythmica, with them, likewise comprehended dumb motions, and, in effect, all rhythmical, i. e. all regular motions.

Porphyry divides music into harmonica, rhythmica, metrica, organica, poetica, and hypocritica.

RHYTHMICAL. (ρυθμικος.) Harmonical; having one sound proportioned to another.

RHYTHMOPŒIA, one of the musical faculties, as they are called, which prescribes rules for the motions, or rhythm.

The ancient rhythmopœia is very defective. We find nothing of it in the books of the ancients, but some general hints, which can scarce be called rules. In their explications there appears nothing but what belongs to the words and verses of their songs, which is a strong presumption they had no other. See RHYTHMICA.

RHYTIDOSIS. See RUTIDOSIS.

RIAL, or RYAL, a Spanish coin. See MONEY-TABLE.

RIAL, or ROYAL, is also the name of a piece of gold anciently current among us for 10*s*.

RIALEXA, a town of New Spain, in Nicaragua, seated on a small river, five miles from the Pacific Ocean, where there is a good harbour. The air is unwholesome, on account of the morasses. It is 60 miles W. of Leon de Nicaragua. Lon. 89. 10 W. Lat. 12. 25 N.

RIB. (*costodiendo*, because they guard the vital viscera.) The ribs are the long curved bones which are placed in an oblique direction at the sides of the chest. Their number is generally twelve on each side; but, in some subjects, it has been found to be thirteen, and in others, though more rarely, only eleven. They are distinguished into true and false ribs. The seven upper ribs, which are articulated to the sternum, are called true ribs; and the five lower ones, which are not immediately attached to that bone, are called false ribs. At the posterior extremity of each rib we observe a small head, divided by a middle ridge into two articulating surfaces, covered with cartilage, which are received into two cavities contiguous to each other, and formed in the upper and lower part of each dorsal vertebra, as is observed in our description of the spine. This articulation, which is secured by a capsular ligament, is a species of ginglimus, and allows

only of motion upwards and downwards. The head of each rib is supported by a short neck, and immediately beyond this we find a flattened tubercle, affording an oblong, and slightly convex surface, which is articulated with the transverse process of the lowest of the two dorsal vertebræ, with which its head is articulated. At some little distance from this tuberosity, the rib makes a considerable curve, which is usually called its angle. From the tubercle to the angle the ribs are of considerable thickness, and approaching to a cylindrical shape; but, from the angle to their anterior extremity, they become thinner and flatter. To this anterior extremity is fixed a long, broad, and strong cartilage, which, in each of the true ribs, reaches to the sternum, where its articulation is secured by a capsular ligament, and by other ligamentous fibres. The cartilages of the sixth and seventh ribs being longer than the rest, are extended upwards, in order to reach the sternum, the inferior portion of which is about on a level with the fifth rib. The cartilages of these two ribs are usually united into one, so as to leave no space between them. The false ribs are supported in a different manner; their cartilages terminate in an acute point before they reach the sternum, the eighth rib being attached by its cartilage to the lower edge of the cartilage of the seventh, or last of the true ribs; the ninth in the same manner to the eighth; and the tenth to the ninth; the cartilages of each rib being shorter than that of the rib above it. The eleventh and twelfth, which are the two lowermost ribs, are not fixed at their anterior extremities like the other ribs, but hang loose, and are supported only by their ligamentous fibres, and by muscles and other soft parts.

The external surface of each rib is somewhat convex, and its internal surface slightly concave. On the inferior and interior surface of these bones we observe a long fossa, for the lodgment of the intercostal vessels and nerves. This channel, however, does not extend through the whole length of the rib, being observable neither at the posterior extremity, where the vessels have not yet reached the bone, nor at the fore end, where they are distributed to the parts between the ribs. We seldom see any marks of it in the short ribs, as in the first, second, eleventh, and twelfth.

Thus far we have given a description, which is applicable to the ribs in general; but, as we find them differing from each other in shape, length, situation, and other respects, it will be right to speak of each rib in particular.

The first rib, which is the shortest of any, is likewise the most curved. It is broader than the other ribs, and, instead of being placed, as they are, obliquely and with its edges upwards and downwards, it is situated nearly in a transverse direction, one of its edges being placed inwards, or nearly so. Of these edges, the inner one is sharp, and the outer one somewhat rounded. Its inner surface is smooth, and its superior surface is sometimes slightly depressed anteriorly by the clavicle. The head of this rib, instead of being angular, is flattened, and slightly convex, being received into a cavity, which is formed wholly in the first vertebra, and not by two vertebræ, as in the case with the other ribs.

The second rib is longer than the first, but shorter than the ribs below it. Its angle is placed at a small distance from its tuberosity, and its head is articulated with two vertebræ, like the other ribs. The other ten ribs, the two last only excepted, differ from the general description we have given, chiefly in the difference of their length, which goes on gradually increasing, from the first or uppermost, to the seventh or last of the true ribs, and as gradually diminishing from that to the twelfth. Their obliquity, in respect to the spine, likewise increases as they descend, as does the distance between the head and angle of each rib, from the first rib to the ninth. The two lowest ribs differ from all the rest, in the following particulars: Their heads, like that of the first rib, are rounded, and received into a cavity formed entirely in the body of one vertebra; they have no tubercle for their articulation with the transverse processes, to which they are only loosely fixed by ligaments, and in this respect the tenth rib is sometimes found to agree with them; they are much shorter than the rest of the false ribs, and the twelfth is still shorter than the eleventh. The length of the latter, however, is different in different subjects, and is not always found to be the same on both sides in the same skeleton. Anteriorly, as we have already observed, their cartilages are short and loose, not being attached to the cartilages of the other ribs; and this seems to be, because the most considerable motions of the trunk are not performed on the lumbar vertebræ alone, but likewise on the lower vertebræ of the back; so that if these two ribs had been confined anteriorly, like the rest, and likewise united to the bodies of two vertebræ, and to the transverse process, this disposition would have impeded the motion of the two last vertebræ of the back, and consequently would have affected the motion of the trunk in general.

RIB, in botany. Costa. The continuation of the petiole along the middle of a leaf, and from which the veins take their rise.

RI'BALD. *s.* (*ribauld*, French; *ribaldo*, Italian.) A loose, rough, mean, brutal wretch (*Spenser*).

RI'BALDRY. *s.* (from *ribald.*) Mean, lewd, brutal language (*Dryden*).

RIBADENEIRA (Peter), a Spanish Jesuit, who wrote with purity in his native tongue, but his works are so puerile and superstitious as not to be worth mentioning, except his Account of the Writers among the Jesuits. He died at Madrid in 1611, aged 84.

RI'BAND. *s.* (*rubande, ruban*, Fr.) A fillet of silk; a narrow web of silk, which is worn for ornament (*Granville*).

RI'BBED. *a.* (from *rib.*) 1. Furnished with ribs (*Sandys*). 2. Inclosed as the body by ribs (*Shakspeare*).

RIBBED. In botany. See COSTATE.

RIBBLE, a river which rises in the W. riding of Yorkshire, runs across Lancashire, and falls into the Irish Sea, below Preston.

RIBBON. See RIBAND.

RIBEIRA GRANDE, a town of St. Jago, the principal of the Cape de Verd Islands, with a good harbour. It is seated between two high mountains. Lon. 23. 24 W. Lat. 15. 0 N.

RIBEMONT, a town of France, in the department of Aisne, seated on an eminence, near the river Oise, 10 miles W. by S. of St. Quentin. Lon. 3. 21 E. Lat. 49. 48 N.

RIBERA (Anastasius Pantaleon de), the Scarron of Spain, was born at Madrid, and became a great favourite at the court of Philip IV. His poems were all on ludicrous subjects, and appeared at Madrid 1648.—A jesuit of that name died professor at Salamanca 1591. He wrote commentaries on the minor prophets, fol.—on St. John's gospel, &c.

RIBES. Currant and gooseberry bush. In botany, a genus of the class pentandria, order monogynia. Petals five, calyx superior, bell-shaped, five-cleft, bearing the petals and stamens; style cloven; berry many-seeded. Seventeen species, natives of Europe or America; seven of our own country. They may be thus subdivided:

A. Unarmed—*Currants*.

B. Armed—*Gooseberries*.

The following are cultivated:

1. R. rubrum. Common currant. Unarmed; racemes glabrous, pendulous; flowers flattish; petals inversely heart-shaped. Common to our own woods.

It yields numerous varieties, as common currant with small red fruit; the same with white fruit; with pale fruit, usually called champaign currant: but since the white and red Dutch currants have been introduced, the older sorts have been almost banished, and are now rarely to be found.

2. R. nigrum. Common black currant. Unarmed; racemes hairy, pendulous, with a simple peduncle at the base; flowers oblong. Common to our hedges.

Of this there are also several varieties, and especially an American currant which has a taste like cranberries. The juice is frequently boiled down to an extract with a certain quantity of sugar, and constitutes a rob very useful and pleasant in sore throats.

3. R. grossularia. Rough-fruited gooseberry. Its colours and varieties are numerous. It is found wild in our hedges.

4. R. uva crispa. Smooth-fruited gooseberry. The varieties of this are also numerous from differences of colour; and like the last it grows wild in our hedges.

5. R. reclinatum. Procumbent gooseberry. When ripe the fruit is usually of a dark purple, but sometimes red, or even yellow. A native of Germany.

6. R. oxycanthoides. Hawthorn-leaved currant. Branches every where prickly, colour at first simple purple; but when ripe dark purple with a blue bloom. A native of Canada.

7. R. cynosbati. Prickly-fruited currant. Prickles mostly axillary; fruit prickly, racemed; germ in the flower prickly; berries armed with prickles. A native of Canada.

Currants are propagable easily by planting their cuttings any time from September to March, watering the young plants in dry weather. When they have stood about two years in this place, they will be fit to transplant to the places where they are to remain; and this should be done when the leaves are just decayed, that they may have time to have rooted before winter. If they are for standards, they should be planted in rows of ten feet distance from one another, and the trees in each row four feet from each other; but the much better way is to train them in espaliers, in which state they take up much less room, and their fruit is much the finer. They should be placed at ten or twelve feet distant in espaliers, and all their branches trained horizontally. They are to be allowed the same distance when set against walls or pales. Those against a south wall ripen their fruit near three weeks sooner than those in the open air; and those against a north wall near as much later; so that, by a little management of this kind, they may be kept a long time in season. Currant trees produce their fruit on the former years wood, and also on small snags that come out of the old wood. This may give a caution as to the manner in which they are to be pruned. They will thrive in any soil, or situation; but this fruit is always best tasted when they grow in a dry soil, and an open spot of ground.

The *gooseberry* is propagated either by suckers or cuttings, but the latter way is preferable, as the roots are less subject to shoot out suckers afterwards. The best season for planting the cuttings is in February, just before the buds begin to open; observing always to take the handsomest shoots, and to pick them from such branches as produce the greatest quantity of fruit. The cuttings should be about eight inches long, and should be planted in a bed of light earth, exposed to the morning sun; they must be planted about three inches deep, and watered to help their taking root. The shoots should all be rubbed off from these plants as they put out, except those at the top, that there may be a regular stem. In the September following, they should be removed to a bed of fine light earth, and planted at two feet distance. They should remain here two years, and the cross branches at times be cut off, as also the lower ones, so as to keep a clean stem about a foot above the ground. They will be then fit to plant out where they are to stand; which should be in a light sandy loam. They should be kept from the shade of other trees; and, to have the fruit in its utmost perfection, should be set in an exposed place in rows of eight feet asunder, and each of the shrubs, six feet from the others in the rows. The best time for transplanting them is in October, after the leaves are fallen.

To RI'BROAST. *v. n.* (*rib* and *roast.*) To beat soundly. A burlesque word (*Butler*).

RIBWORT. See PLANTAGO.

RIC, denotes a powerful, rich, or valiant man; thus *Alfric* is altogether strong; *Æthelric*, nobly powerful (*Gibson*).

RICAUT or RYCAUT (Sir Paul), the time of whose birth is not known, but in 1661 he went as secretary to the earl of Winchelsea, then appointed ambassador to the Ottoman Porte. While at Constantinople he wrote The present State of the Ottoman Empire. The earl of Clarendon made him his principal secretary for the provinces of Leinster and Connaught; and James II. knighted him, and made him one of the privy counsel for Ireland, and judge of the high court of admiralty; which he enjoyed till the revolution in 1688. King William made him his resident with the Hanse towns. He died in 1700. He translated Platina's lives of the popes.

RICCATI (Vincent), a Jesuit, born at Castel-Franco, in the territory of Trevisa. He became professor of mathematics at Bologna, and published a learned work on the Integral Calculus, 3 vols. 4to. He died in 1775, aged 68.

RICCI (Sabastian), a painter, born at Belluno in 1659. The imperial court employed him to adorn the palace of Shoenbrun, after which he came to London, where he enriched himself, and then went to Venice, in which city he died in 1734.

RICCIA, in botany, a genus of the class cryptogamia, order hepaticæ. Calyxless; corolless: anthers cylindrical, sessile on the germ, perforated by the style; capsule globular, crowned with the withered anthers; seeds hemispherical, pedicelled. Eleven species, five indigenous to our own country.

RICCIOLI (Joannes Baptista), a learned Italian astronomer, philosopher, and mathematician, was born in 1598, at Ferrara, a city in Italy, in the dominions of the pope. At 16 years of age he was admitted into the society of the Jesuits. He was endowed with uncommon talents, which he cultivated with extraordinary application; so that the progress he made in every branch of literature and science was surprising. He was first appointed to teach rhetoric, poetry, philosophy, and scholastic divinity, in the Jesuits' colleges at Parma and Bologna; yet applied himself in the mean time to making observations in geography, chronology, and astronomy. This was his natural bent, and at length he obtained leave from his superiors to quit all other employment, that he might devote himself entirely to those sciences.

He projected a large work, to be divided into three parts, and to contain as it were a complete system of philosophical, mathematical, and astronomical knowledge. The first of these parts, which regards astronomy, came out at Bologna in 1651, 2 vols. folio, with this title, J. B. Riccioli Almagestum Novum, Astronomiam veterem novamque complectens, observationibus aliorum et propriis, novisque theorematibus, problematibus ac tabulis promotam. Riccioli imitated Ptolemy in this work, by collecting and digesting into proper order, with observations, every thing ancient and modern, which related to his subject; so that Gassendus very justly called his work, Promptuarium et thesaurum ingentem Astronomiæ.

In the first volume of this work, he treats of the sphere of the world, of the sun and moon, with their eclipses; of the fixed stars, of the planets, of the comets and new stars, of the several mundane systems, and six sections of general problems serving to astronomy, &c.—In the second volume, he treats of trigonometry, or the doctrine of plane and spherical triangles; proposes to give a treatise of astronomical instruments, and the optical part of astronomy (which part was never published); treats of geography, hydrography, with an epitome of chronology.—The third comprehends observations of the sun, moon, eclipses, fixed stars and planets, with precepts and tables of the primary and secondary motions, and other astronomical tables.

Riccioli printed also two other works, in folio, at Bologna, viz.

2. Astronomia Reformata, 1665: the design of which was, that of considering the various hypotheses of several astronomers, and the difficulty thence arising of concluding any thing certain, by comparing together all the best observations, and examining what is most certain in them, thence to reform the principles of astronomy.

3. Chronologia Reformata, 1669.

Riccioli died in 1671, at 73 years of age.

RICE. In botany. See ORYZA.

RICE BIRD. In ornithology. See ORYZIVORA.

RICE BUNTING. See EMBERIZA.

RICERCARI. (Ital.) The name formerly given to solfeggi for the voice, as also to original compositions, or exercises, for instruments. This term in the early times of counterpoint was used instead of the word fantasia, which afterwards supplied its place; and to this succeeded the terms concento, concerto, sinfonia, sonata, &c.

RICH. *a.* (*riche*, French; ric, Saxon.) 1. Wealthy; abounding in wealth; abounding in money or possessions; opulent (*Seed*). 2. Valuable; estimable; precious; splendid; sumptuous (*Milton*). 3. Having any ingredients or qualities in a great quantity or degree (*Waller*). 4. Fertile; fruitful (*Philips*). 5. Abundant; plentiful (*Milton*). 6. Abounding; plentifully stocked; as, *pastures* rich *in flocks*. 7. Having something precious.

RICHARD I. king of England, surnamed Cœur de Lion, or Lion-hearted, succeeded his father Henry II. the 6th of July 1189, at which time he was count of Poitou, and duke of Normandy. He commenced his reign by selling the crown-lands, and exacting money on various pretences in order to go to the holy war. He undertook this expedition in 1190,

when he embarked with his whole army for France, where he joined the forces of the French king; and they having ratified their alliances, marched together with their combined forces, which consisted of an hundred thousand men, as far as Lyons, where they separated, and Richard continuing his march to Marseilles, reimbarked there for Sicily, where the two kings spent the winter; and the next spring, continuing their voyage, Richard with his fleet was driven on shore in the island of Cyprus, where Isaac, the king of the island, treating the English with inhumanity, Richard took him and his daughters prisoners, loaded the Cyprian monarch with silver chains, and having thus conquered the isle of Cyprus, exchanged it with Guy Lusignan for the titular kingdom of Jerusalem. Richard afterwards gained a complete victory over Saladin, took the city of Acre, and made himself master of Ascalon, Joppa, and Cesarea; but being deserted by Philip Augustus, king of France, and the dukes of Burgundy and Austria, he could not continue his conquests; and therefore on hearing that his brother John was aspiring to the throne of England, he concluded a truce of three years with Saladin, and embarked in order to return to his dominions; but having the misfortune to be shipwrecked near Aquileia, he resolved to pursue his journey in disguise through Germany; but after several difficulties, was taken when he was asleep, in a mean lodging near Vienna, by order of Leopold duke of Austria, whom he had disobliged at the siege of Acre; and that duke delivered him up, the following year, to the emperor Henry VI. who, after treating him with great indignities, obliged him to pay 150,000 marks for his ransom, which his loyal subjects cheerfully raised by a voluntary tax. He then returned to England, after an absence of four years, of which he had passed fifteen months in prison. He soon suppressed the party raised by his brother John, confiscated his lands, and then raising a numerous army, invaded France, and afterwards, at the battle of Blois, took all the archives of the kingdom, and continued the war against Philip, with various success, for five years, after which a truce was concluded. but a gentleman of Limosin having discovered a treasure upon his estate, Richard laid claim to it as sovereign of Guienne, and besieging the gentleman in the castle of Chaluz, was wounded by an arrow in the shoulder, of which he died eleven days after, on the 6th of April 1199. Richard had a tall, graceful, fair, and well-proportioned person. His eyes were blue and sparkling, and his hair of a bright yellow, inclining to red. He had prodigious strength of body, amazing courage and intrepidity, and was an illustrious warrior, but exceedingly ambitious, proud and avaricious, and his love of glory made him neglect the happiness of his people. The reverend Mr. Granger observes, that the saint-errantry of Richard, who sacrificed all other views for the glory of the crusades, is an instance, among a thousand others, that offensive and enterprizing valour may be a worse quality than cowardice itself; and that he was but eight months in his kingdom during a reign of ten years.

RICHARD II. king of England, was the son of Edward the Black Prince, and succeeded his grandfather, Edward III. the 21st of June 1377, at eleven years of age; when the parliament appointed several governors to the king, and ordered that his three uncles, with some of the nobility, should be regents of the kingdom. A truce which had been agreed to with France being now expired, the French sent a fleet to ravage the coasts of England, and the regents ordered out a fleet to oppose them. The king of France also prevailed on Robert II. king of Scotland to invade England; but the French king dying, the military preparations were suspended. In 1380, a poll-tax being raised on all persons above fifteen years of age, for the assistance of Ferdinand, king of Portugal, against John, king of Castile, it was levied with the greatest rigour and brutality by the collectors, on which a rebellion was raised, and an hundred thousand men appeared in arms, headed by Watt Tyler, a tyler of Deptford, and Jack Straw, who committed innumerable disorders, and entered London without opposition; but William Walworth, the mayor, killing Watt Tyler with a blow of his sword, this great army was easily dispersed. The kingdom soon after becoming greatly exasperated at the fondness shewn by the king for his new favourites, Robert de Vere, earl of Oxford, and Michael de la Poole, a merchant's son, whom he had created earl of Suffolk, the parliament refused to grant the supplies, unless he dismissed them from his service; but though the king said, that "to please the parliament he would not discharge the meanest scullion in his kitchen," and sent his chancellor to order them to grant the desired subsidy, he was obliged to part with his favourites, and to admit of fourteen commissioners to take care of the public affairs jointly with himself. The parliament were, however, no sooner dissolved, than they were recalled, and the king sent orders to the sheriffs to let no representatives be chosen but what were in his list. He also endeavoured to raise an army, to chastise his uncle the duke of Gloucester, and the earls of Arundel, Warwick, Derby, and Nottingham, who were enemies to his favourites, and were considered as the protectors of the people: but these lords speedily levying forces, defeated the earl of Oxford, who had been made duke of Ireland; when the king took refuge in the Tower, where, the next year, he answered the complaints of the lords with a shower of tears, consented to the banishment of his favourites, who were accordingly sent into exile, and repeated his coronation oath. In 1392, the Londoners refusing to lend the king a sum of money, he took away their charter, and removed the courts of justice to York. Anne of Luxemburgh, the emperor's daughter, and the king's first wife, dying in 1394, he, in 1396, married Isabella, the daughter of Charles VI. king of France, who was only seven years of age, when a truce was concluded for twenty-eight years. Richard, however, extorted

money from his subjects, and, for inconsiderable sums, yielded Cherburg to the king of Navarre, and Brest to the duke of Britanny: he ordered the duke of Gloucester to be seized and conveyed to Calais, where he was privately strangled, and some of the nobility were beheaded, and others banished. The Scots ravaged the borders of England, the Irish revolted, and the merchant ships were plundered with impunity by the corsairs of Holland. Seventeen counties were condemned as guilty of treason, and the estates of all the inhabitants adjudged to the king, for granting assistance to the duke of Gloucester; but the king landing in Ireland, in 1399, with a powerful army, in order to chastise the rebels, a rebellion was raised in his absence; when the king, at his return, finding that the revolt was general, shut himself up in Conway castle, and soon after submitted to Henry duke of Lancaster, and was sent to the Tower; when a parliament being called, he was solemnly deposed, and Henry proclaimed king, on the 30th of September 1399; after which he was removed to Pontefract castle in Yorkshire; but on the 14th of February 1400, sir Pierce Exton, with eight ruffians, undertook to murder him, hoping thereby to please king Henry IV. and rushed into the room where he was, when Richard bravely wrested a pole-ax from one of the assassins, with which he slew four of them; but Exton mounting on a chair behind him, struck him on the head with such violence, that Richard dropped down dead, in the thirty-third year of his age, after a reign of twenty-two years, and was interred at King's Langley in Hertfordshire; but his body was afterwards removed to Westminster-abbey, by order of king Henry V. King Richard II. had a very graceful person, and was of a sprightly disposition. He was particularly remarkable for his tyranny, and the numerous breaches of his oaths, and most solemn engagements.

Richard III. king of England, surnamed Crook-backed Richard, was the brother of Edward IV. and raised himself to the throne by a series of inhuman murders. Henry VI. and the young prince his son, with several noblemen of the first rank, died while he was duke of Gloucester, to prepare the way for his usurping the throne from Edward IV. He was proclaimed king the 20th of June 1483, in the thirty-second year of his age, but delayed the ceremony of his coronation till the 6th of July; and soon after caused Edward V. and his brother, whom he had before declared to be bastards, to be smothered in the Tower. The same year, having broke his promise to the duke of Buckingham, who had been greatly instrumental in raising him to the throne, that nobleman took up arms against him, in order to assist Henry earl of Richmond, the last branch of the house of Lancaster, to obtain the crown; but Buckingham being betrayed by a fellow who had been his servant, for the sake of a reward of a thousand pounds offered for taking him, he was beheaded at Salisbury, without any legal process. However, the earl of Richmond obtaining assistance from the duke of Brittany, sailed from St. Maloes, on the 12th of October, with five thousand men, and forty ships; but his fleet being dispersed, he returned to Brittany, and afterwards to France. Richard, in the mean time, sacrificed many persons to his revenge, and sent sir Ralph Ashton into the western counties, with power to execute upon the spot all such persons whom he even suspected to be guilty of high treason; and finding that the earl of Richmond founded his projects on the hopes of marrying Elizabeth, the daughter of Edward IV. he resolved to marry that princess himself, though he was already married to the widow of the prince of Wales, the son of Henry VI. whom he had himself murdered: and therefore now, in order to obtain Elizabeth, he is said to have poisoned his queen. The earl of Richmond, however, landed in Wales, with two thousand men, which increased to five thousand, and with this small army engaged the king's forces, which consisted of thirteen thousand men, at Bosworth: but the earl being joined by the lord Stanley and his brother with fresh troops, he gained a complete victory, when Richard, finding that the day was lost, rushed into the midst of his enemies, and died with his sword in his hand. The crown being found after the battle, was placed on the head of Henry earl of Richmond; and Richard's body was taken up entirely naked, and covered with blood and dirt, in which condition it was thrown across a horse, carried to Leicester, and interred without the least ceremony. Thus perished Richard on the 22d of August 1485, in the thirty-fourth year of his age, after an infamous reign of two years. Thus Richard III. if any regard is to be paid to the generality of our historians, was, through the whole course of his life, restrained by no principle of justice or humanity: and it appears that he endeavoured to maintain the crown by the same fraud and violence by which he obtained it. Though Mr. Walpole has struck new light into the darkest passages of English history, and has brought many presumptive proofs, that Richard was neither that deformed person, nor that monster of cruelty and impiety which he was represented by historians, yet though Mr. Walpole has done much towards clearing up the character of Richard, he has left the matter still problematical.

RICHARDIA, in botany, a genus of the class hexandria, order monogynia. Calyx six-parted; corol one-petalled, somewhat cylindrical; seeds three. One species, a herb of Vera Cruz.

RICHARDSON (Jonathan), a portrait painter. He was apprenticed to a scrivener, but afterwards became the pupil of Riley, whose niece he married. He acquired reputation, though some speak of him with indifference, and died 1745, aged 80. He published, in 1719, an essay on the whole art of criticism, as it relates to painting, and an account of some statues, bas reliefs, &c. He afterwards with his son produced notes and remarks on

Milton's Paradise Lost. As the father had observed, that in classical literature, he had looked at it through his son, the sportive pencil of Hogarth represented him as peeping at a Virgil on a shelf, through a telescope, with which his son was perforated.

RICHARDSON (Joseph), of Hexham, Northumberland, entered at St. John's college, Cambridge, in 1774, and afterwards studied at the Middle Temple. He wrote criticisms on the Rolliad, and probationary odes for the laureatship, in which he censured with broad satire the great public characters of the times —the Fugitive, a comedy, performed with some applause, &c. He was for some time in parliament, but did not distinguish himself as an orator. He died 1803.

RICHARDSON (Samuel), an eminent novel writer, son of a farmer in Derbyshire, born 1689. Though he imbibed in his youth no knowledge of the learned languages, his good sense and reflection supplied the deficiencies of art. In 1706 he was bound apprentice to Mr. Wilde, of Stationers' hall, and afterwards worked as compositor, and corrector of the press; then he hired a house in one of the courts of Fleet-street, from which he removed to Salisbury-square. He was in 1723 engaged with the duke of Wharton in the publication of the True Briton; but as the work was severe against the government, he stopped at the sixth number. He next was concerned with the daily Journal, and afterwards with the daily Gazetteer, and at last, by the friendship of Onslow, the speaker, he obtained the lucrative office of printer of the journals of the commons. In 1760 he purchased a moiety of the patent of law printer to the king, which he conducted with Miss Lintot, afterwards the wife of sir H. Fletcher. In 1740 he published Pamela, or Virtue rewarded, a novel, universally read, and universally approved; and afterwards he produced Clarissa Harlowe, and Sir Charles Grandison. Of these two last performances, the former is regarded by critics as superior to the other; but in all his works the author has presented to his reader a most interesting and accurate picture of human nature. His wish was to benefit mankind, and with all the treasures of a benevolent heart, he drew scenes which gave virtue the noblest of her attractions, and vice the most disgusting of its deformities. By the creative faculties of his mind, Richardson thus raised himself to celebrity and opulence; but his elevation was still adorned by all the humble virtues which rejoice in the opportunity of doing good. He generally retired from his town house on the Saturday, to his villa, at North End, Hammersmith, and afterwards to Parsons' Green, where he resided till the Monday, and was visited by persons of rank, literary fame, and splendid talents. Sedulous in business, he acquired independence; but in the midst of wealth, and the flattery of admiring friends, he was the kind master and the hospitable friend, and never forgot to add exemplary conduct to religious appearances. He was afflicted in the last part of his life with a paralytic disorder, which proved fatal, 4th July 1761, in his 72d year. He was twice married: by his first wife he had five sons and one daughter, who all died young; and by the second, who survived him, daughter of Mr. Leake, bookseller of Bath, he had a son and five daughters, of whom only four daughters survived him. Besides his excellent novels, he published a volume of familiar letters, for the use of young people—Æsop's fables, with reflections—a paper, No. 97, in the Rambler—Negotiations of sir Thomas Roe, embassador to the Porte, &c. A well-written account of his life has appeared in 1804, by Mrs. Barbauld, prefixed to an edition of his correspondence with eminent persons. (*Lempriere*).

RI'CHED. *a.* (from *rich.*) Enriched.

RICHELIEU (John Armand Du Plessis de), a famous cardinal, and prime minister of France, born in 1585. He took his degrees at the Sorbonne, and going to Rome, had interest enough to obtain from pope Paul V. a dispensation to be bishop of Lucon, at twenty-two years of age. His reputation for preaching procured him the place of almoner to the queen, Mary de Medicis, and in 1616 the king made him secretary of state. A revolution in state affairs happening by the death of the Marquis d'Ancre, he retired to Avignon, and composed several theological works. His ambition and vast capacity kept him in perpetual agitation and inquietude. He had by turns to combat with the nobles of the kingdom, the royal family, and even Louis XIII. himself. He was not free from those little passions which too often fall to the share of men of letters. Being a poet himself, he envied Corneille the glory of his Cid, and in 1637 instigated the French academy to publish a criticism upon it to its disadvantage. He owed his cardinalship to Gregory XV. He was created a duke and peer of France, and died in 1642, before he had time to complete any of his grand designs.

RICHERIA, in botany, a genus of the class dioecia, order pentandria. Calyx four or five-cleft; petals four or five; nectaries four or five; glands at the base of the germ. Male: stamens between the glands of the nectary. Female: styles three-cleft; capsule covered with a bark, three-celled, six-valved; seeds solitary, pendulous. One species, a large tree of Montserrat.

RI'CHES. *s.* (*richesses*, Fr.) 1. Wealth; money or possessions (*Locke*). 2. Splendid sumptuous appearance (*Milton*).

RI'CHLY. *ad.* (from *rich.*) 1. With riches; wealthily; splendidly; magnificently (*Milton*). 2. Plenteously; abundantly (*Brown*). 3. Truly; abundantly (*Addison*).

RICHMAN (George William), an able philosopher, was born July 11th, 1711, at Pernau. He was the son of William Richman, treasurer of the king of Sweden, who was carried off by the plague at the close of 1714. Having laid the foundation of his learning at the Gymnasium at Revel, he prosecuted his

studies at the universities of Halle and Jena, where he always made mathematics and philosophy his principal objects. He was made a member of the Imperial Academy of Sciences at Petersburg, in 1735; extraordinary professor in 1741; and ordinary professor of experimental philosophy in 1745. Among his other scientific enquiries, he pursued with great ardour the subject of electricity, and was one of the first that drew lightning from the clouds. In repeating this most interesting but bold experiment, July 26th 1753, he was struck dead. An account of this lamentable event, with the appearances after death, &c. may be seen in the Philosophical Transactions for 1755; or in the New Abridgment, vol. x. pa. 574.

RICHMOND, a borough in N. Yorkshire, governed by a mayor, with a market on Saturday. It was inclosed by a wall, with three gates, now in ruins; and has a castle, on an inaccessible mount, and two churches. It is the capital of a district called Richmondshire, which abounds in lead mines, and was formerly a county of itself. Richmond has a manufacture of woollen stockings, caps, &c. It is seated on the Swale, over which is a bridge, 40 miles N.W. of York, and 230 N.N.W. of London. Lon. 1. 35 W. Lat. 54. 28 N.

RICHMOND, a village in Surry, with a stone bridge over the Thames, nine miles W.S.W. of London. It was anciently called Sheen; but Henry VII. called it Richmond, on account of his having been earl of Richmond in Yorkshire. Here was a palace, in which Edward III. Henry VII. and queen Elizabeth expired. Richmond is still distinguished by its beautiful royal gardens, which, in summer, are open to the public; and in these is a noble observatory. Here is an extensive royal park, called Richmond, or the New Park; surrounded by a brick wall built by Charles I.

RI'CHNESS. *s.* (from *rich.*) 1. Opulence; wealth (*Sidney*). 2. Finery; splendour. 3. Fertility; fecundity; fruitfulness (*Addison*). 4. Abundance or perfection of any quality. 5. Pampering qualities (*Dryden*).

RICINUS. Mexico seed: palma christi. Cataputia major. In botany, a genus of the class monœcia, order monadelphia. Male: calyx five-parted; corolless; filaments very numerous, filiform. Female: calyx five-parted; corolless; styles three, cloven; capsule three-celled, three-valved; seeds solitary. Six species. Natives of both the Indies.

The species most worthy of notice, and which alone is cultivated, is R. communis, common palma christi, or castor oil tree. Twenty feet high, which it reaches in a single year's growth: trunk woody, pith large; leaves peltate, somewhat palmate; flower spiked; spike thickly beset with blossoms of a yellow hue and conic form; capsules prickly, containing three smooth, grey, mottled seeds, which as soon as the spikes turn black, and are gathered and dried in the sun, are picked out and collected for use. It is a native of the Indies.

The tree affords several varieties, as the great American palma christi, the green-stalked American palma christi, the wrinkled-capsuled palma christi, the red-stalked palma christi, small American palma christi, and livid-leaved palma christi. They are all propagable by seeds sown upon a hot-bed in spring, the plants being afterwards transplanted into separate pots. They have a fine ornamental effect from their leaves among other potted green-house plants, as well as in clumps when cultivated as annuals, but they require considerable space.

R. communis appears to be the Κικι or Κροτων of Dioscorides, who observes, that the seeds are powerfully cathartic; it is also mentioned by Ætius, Paulus Ægineta, and Pliny. The ricinus was first cultivated in England in the time of Turner, and is now annually reared in many gardens in the neighbourhood of London; and in that of Dr. Saunders, at Highbury, the plant grew to a state of great perfection. An oil extracted from the seeds of this plant, and known by the name of oleum ricini, palma christi, or castor oil, is the drug to which the pharmacopœias refer, and which has lately come into frequent use, as a quick but gentle purgative.

The London college directs this oil to be expressed from the seeds in the same way as that of the oil of almonds, and without the assistance of heat, by which the oil would seem to be obtained in the purest state. However, we have some reason to believe that this method is seldom practised, and that the oil usually employed here is imported from the West Indies, where it is commonly prepared in the following manner. "The seeds being freed from the husks or pods, which are gathered upon their turning brown, and when beginning to burst open, are first bruised in a mortar, afterwards tied up in a linen bag, and then thrown into a large pot, with a sufficient quantity of water (about eight gallons to one gallon of the seeds), and boiled till the oil is risen to the surface, when it is carefully skimmed off, strained, and kept for use. Thus prepared, the oil is entirely free from acrimony, and will stay upon the stomach when it rejects all other medicines." Mr. Long remarks, that the oil intended for medicinal use is more frequently cold drawn, or extracted from the bruised seeds by means of a hand-press. But this is thought more acrimonious than that prepared by coction. Dr. Browne is also of this opinion, and prefers the oil procured by coction to that by expression: he attributes its greater mildness to the action of the fire, observing, that the expressed oil, as well as the mixed juices of the seeds, are far more active and violent in their operation.

Dr. Cullen observes, that "this oil, when the stomach can be reconciled to it, is one of the most agreeable purgatives we can employ. It has this particular advantage, that it operates sooner after its exhibition than any other purgative I know of, as it commonly operates in two or three hours. It seldom gives any griping, and its operation is generally moderate,

to one, two, or three stools only. It is particularly suited to cases of costiveness, and even to cases of spasmodic cholic."

In the West Indies it is found to be one of the most certain remedies in the dry belly-ach, or colica pictonum. It is seldom found heating or irritating to the rectum; and therefore is sufficiently well suited to hæmorrhoidal persons.

The only inconvenience attending the use of this medicine is, that as an oil it is nauseous to some persons; and that when the dose is large, it occasions sickness at the stomach for some time after it is taken. To obviate these inconveniences, several means have been tried; and it is found that the most effectual means is the addition of a little ardent spirit.

For this, in the West Indies, they employ rum; but that we may not withdraw any part of the purgative, it is better to employ the tinct. sennæ comp. This added in the proportion of one to three parts of the oil, and very intimately mixed, by being shaken together in a phial, both makes the oil less nauseous to the taste, and makes it sit more easy on the stomach. The common dose of this oil is a table spoonful, or half an ounce; but many persons require a double quantity.

Castor oil however is frequently found to produce very violent pain, and extreme sickness. Dr. Stone conceives this to arise from the improper mode in which it is prepared. He inclines to believe that the cathartic matter is a substance distinct from the oil itself, and results from the capsule or husk of the seed, whose purgative property is more or less combined with the oil during expression: and he adds that when entirely freed from this purgative matter of the husk castor oil is not more purgative than any other expressed oil. This subject seems to require further consideration.

Castor oil is now used very generally for lamps in America; and in sugar plantations, where a great quantity of it is wanted for this purpose, it has altogether superseded the use of train-oil, being equally cheap in purchase, and affording a far clearer light, without any offensive smell.

RICINUS MAJOR. Ricinoides. Pineus purgans. Pinhones indici. Faba cathartica. Nux cathartica americana. Nux harbadensis. An oblong black seed, the produce of the jatropha curcas; foliis cordatis angulatis of Linnéus. It affords a quantity of oil, which is given in many places as the castor oil is in this country, to which it is very nearly allied. The seeds of the jatropha multifida are of an oval and triangular shape, of a pale brown colour, are called purging nuts, and give out a similar oil.

RICK. *s.* See REEK. 1. A pile of corn or hay regularly heaped up in the open field, and sheltered from wet (*Swift*). 2. A heap of corn or hay piled by the gatherer (*Mortimer*).

RICKETS, in sheep, a disease produced by an internal worm, denominated by Linnéus tænia cerebralis, of the same genus as the tape-worm, found in vast numbers in the brain of sheep, or spinal marrow immediately beneath the brain. These animals are aggregate, or rather consist of numerous animalcules united by their base to a large common vesicle, distributed about the surface, and retractile within it. The disease is chiefly distinguished by the symptoms of giddiness and staggering, and is not unfrequently called the *dunt*. If the vesicle producing this disease, and containing these noxious animalcules be broken, the morbid affection is rendered incurable; for these minute worms, in size not larger than a grain of sand, are each of them furnished with from thirty-two to thirty-six hooks on the head, by which they fix themselves firmly to the substance of the brain or its coats. They chiefly attack yearling lambs.

RICKETY. *a.* Diseased with the rickets (*Arbuthnot*).

RICKMANSWORTH, a town in Hertfordshire, with a market on Saturday, seated on the Coln, eight miles S.W. of St. Alban, and 18 W.N.W. of London.

RICOBONI (Anthony), born at Rovigo, in 1541, professor of eloquence at Padua, at which place he died in 1599, after having written Historical Commentaries, and Commentaries on Aristotle, and some parts of Cicero's works.

RICOCHET FIRING, in the military art, is a method of firing with small charges, and pieces elevated but in a small measure, as from 3 to 6 degrees. The word signifies duck and drake, or rebounding, because the ball or shot, thus discharged, goes bounding and rolling along, and killing or destroying every thing in its way, like the bounding of a flat stone along the surface of water when thrown almost horizontally.

RICOTIA, in botany, a genus of the class tetradynamia, order siliquosa. Silique one-celled, oblong, compressed, with flat valves. One species; a branching herb of Egypt with purple flowers.

RI'CTURE. *s.* (*rictura*, Lat.) A gaping.

RID. The preterit of *ride*.

To RID. *v. a.* (from hpiðdan, Saxon.) 1. To set free; to redeem (*Exodus*). 2. To clear; to disencumber (*Addison*). 3. To despatch (*Shakspeare*). 4. To drive away; to remove by violence; to destroy (*Shakspeare*).

RI'DDANCE. *s.* (from *rid.*) 1. Deliverance (*Hooker*). 2. Disencumbrance; loss of something one is glad to lose (*Shakspeare*). 3. Act of clearing away any encumbrances (*Milton*).

RI'DDEN. The participle of *ride*.

RI'DDLE. *s.* (ꝛæðelꝛ, Saxon.) 1. An enigma; a puzzling question; a dark problem (*Milton*). 2. Any thing puzzling (*Hudibras*). 3. (hpiddle, Saxon.) A coarse or open sieve (*Mortimer*).

To RI'DDLE. *v. a.* (from the noun.) 1. To solve; to unriddle (*Dryden*). 2. To separate by a coarse sieve (*Mortimer*).

To RI'DDLE. *v. n.* To speak ambiguously or obscurely (*Shakspeare*).

RI'DDLINGLY. *ad.* (from *riddle.*) In the manner of a riddle; secretly (*Donne*).

To RIDE. *v. n.* pret. *rid* or *rode*; part. *rid* or *ridden.* (ꝛıꝺan, Saxon; *rijden*, Dutch.) 1. To travel on horseback (*Shakspeare*). 2. To travel in a vehicle; to be born; not to walk (*Burnet*). 3. To be supported in motion (*Shakspeare*). 4. To manage a horse (*Dryden*). 5. To be on the water (*Hayward*). 6. To be supported by something subservient (*Shakspeare*).

To RIDE. *v. a.* 1. To sit on so as to be carried (*Milton*). 2. To manage insolently at will (*Swift*).

RIDE, in the sea language, is a term variously applied: thus a ship is said to ride, when her anchors hold her fast, so that she does not drive by the force either of the wind or tide. A ship is said to ride across, when she rides with her fore and main yards hoisted up to the hounds, and both yards and arms topped alike. She is said to ride well, when she is built so as not to overbeat herself in a head-sea, the waves over raking her from stem to stern. To ride athwart, is to ride with her side to the tide. To ride betwixt wind and tide, is to ride so that the wind has equal force over her one way, and the tide the contrary way. If the wind has more power over the ship than the tide, she is said to ride wind-road, or to ride a great wind.

RIDE, a town in Hampshire, on the N.E. coast of the Isle of Wight. It has a daily intercourse by packet-boats with Portsmouth, and sends to that place abundance of butter, eggs, and poultry. It is five miles S.S.W. of Portsmouth, and six E.N.E. of Newport.

RIDEAU, in fortification, is a small elevation of earth, extending lengthwise on a plain, and serving to cover a camp, or to give an advantage to a post. Rideaus are also convenient for those who would besiege a place, and serve to secure the workmen in their approaches to the foot of a fortress.

RI'DER. *s.* (from *ride.*) 1. One who is carried on a horse or in a vehicle (*Prior*). 2. One who manages or breaks horses (*Shaks.*). 3. An inserted leaf.

RIDGE. *s.* (hꝛıꝛʒ, Saxon; *rig*, Danish; *rugge*, Dutch, the back.) 1. The top of the back (*Hudibras*). 2. The rough top of any thing, resembling the vertebres of the back (*Milton*). 3. A steep protuberance (*Dryden*). 4. The ground thrown up by the plough (*Mortimer*). 5. The top of the roof rising to an acute angle (*Moxon*). 6. *Ridges* of a horse's mouth are wrinkles or risings of the flesh in the roof of the mouth, running across from one side of the jaw to the other (*Farrier's Dictionary*).

To RIDGE. *v. a.* (from the noun.) To form a ridge (*Milton*).

RIDGELY (Thomas), born in London in 1670, was elected minister of a congregation of protestant dissenters. He wrote a Commentary on the Assembly's larger Catechism, and died in 1737.

RIDGES, or WRINKLES, of a horse's mouth, the risings of the flesh in the roof of a horse's mouth, which run across from one side of the jaw to the other, having interjacent furrows. Upon the third or fourth ridge, the stroke is given with the horn, in order to bleed a horse in the mouth. See HORN.

RI'DGIL. RI'DGLING. *s.* (*ovis rejicula*, Latin. *Ainsworth.*) A ram half castrated (*Dryden*).

RI'DGY. *a.* (from *ridge.*) Rising in a ridge (*Dryden*).

RI'DICULE. *s.* (*ridiculum*, Latin.) Wit of that species that provokes laughter (*Swift*).

To RI'DICULE. *v. a.* (from the noun.) To expose to laughter; to treat with contemptuous merriment (*Temple*).

RIDICU'LER. *s.* One that ridicules.

RIDI'CULOUS. *a.* (*ridiculus*, Lat.) Worthy of laughter; exciting contemptuous merriment (*South*).

RIDI'CULOUSLY. *ad.* In a manner worthy of laughter or contempt (*South*).

RIDI'CULOUSNESS. *s.* (from *ridicule.*) The quality of being ridiculous (*Stillingfleet*).

RI'DING. *particip. a.* Employed to travel on any occasion (*Ayliffe*).

RIDING. See HORSEMANSHIP.

RIDING, signifies also a district visited by an officer. Yorkshire is divided into three ridings, each of which has a lord lieutenant, viz. the east, west, and north ridings. In all indictments in that county, both the town and the riding must be expressed.

RI'DINGCOAT. *s.* (*riding* and *coat.*) A coat made to keep out weather (*Swift*).

RI'DINGHOOD. *s.* (*riding* and *hood.*) A hood used by women, when they travel, to bear off the rain (*Arbuthnot*).

RIDLEY (Nicholas), bishop of London, and a martyr to the reformation, was descended of an ancient family, and born in the beginning of the 16th century, at Wilmontswick in Northumberland. From the grammar-school at Newcastle upon Tyne, he was sent to Pembroke-hall in Cambridge, in the year 1518, where he was supported by his uncle Dr. Robert Ridley, fellow of Queeen's college. In 1522 he took his first degree in arts; two years after, was elected fellow; and, in 1525, he commenced master of arts. In 1527, having taken orders, he was sent by his uncle, for further improvement, to the Sorbonne at Paris; from thence he went to Louvain, and continued abroad till the year 1529. On his return to Cambridge, he was chosen under-treasurer of the university; and, in 1533, was elected senior proctor. He afterwards proceeded bachelor of divinity, and was chosen chaplain of the university, orator, and *magister glomeriæ*. At this time he was much admired as a preacher and disputant. He lost his kind uncle in 1536; but was soon after patronised by Dr. Cranmer, archbishop of Canterbury, who made him his domestic chaplain, and presented him to the vicarage of Herne in East Kent; where, we are told, he preached the doctrine of the reformation. In 1540, hav-

ing commenced doctor of divinity, he was made king's chaplain; and, in the same year, was elected master of his college in Cambridge. Soon after, Ridley was collated to a prebend in the church of Canterbury; and it was not long before he was accused in the bishop's court, at the instigation of bishop Gardiner, of preaching against the doctrine of the Six Articles. The matter being referred to Cranmer, Ridley was acquitted. In 1545, he was made a prebendary of Westminster abbey; in 1547 was presented by the fellows of Pembroke-hall to the living of Soham, in the diocese of Norwich; and the same year was consecrated bishop of Rochester. In 1550 he was translated to the see of London; in which year he was one of the commissioners for examining bishop Gardiner, and concurred in his deprivation. In the year 1552, our prelate returning from Cambridge, unfortunately for himself, paid a visit to the princess, afterwards queen Mary; to whom, prompted by his zeal for reformation, he expressed himself with too much freedom: for she was scarcely seated on the throne when Ridley was doomed a victim to her revenge. With Cranmer and Latimer he was burnt alive at Oxford, on the 16th October 1555. He wrote, 1. A treatise concerning images in churches. 2. Brief declaration of the Lord's Supper. 3. Certain godly and comfortable conferences between bishop Ridley and Mr. Hugh Latimer, during their imprisonment. 4. A comparison between the comfortable doctrine of the Gospel and the traditions of the Popish religion; and other works.

RIDLEY (Dr. Gloster), an English divine, born on board the Gloster Indiaman at sea, in 1702. He received his education at Winchester school, from whence he was sent to New-college, Oxford, where he was chosen fellow in 1729. For a long time he had no other ecclesiastical preferment than the living of Westow in Norfolk, and the donative of Poplar in Middlesex; but at length archbishop Secker gave him a prebend in the cathedral of Salisbury. He died in 1774. Dr. Ridley wrote the life of bishop Ridley, an answer to the Confessional, a Review of Philip's Life of Pole, and several poems. His son James wrote the Tales of the Genii, in 2 vols. 12mo.

RIDOTTO. A species of entertainment consisting of singing and dancing, in the latter of which the whole company joins. The ridotto was first introduced in this country in the year 1722, at the Opera-house in the Haymarket, and has since been repeated at Vauxhall, and other places of public resort, with considerable success.

RIE, in botany. See SECALE.

RIETI, a town of Italy, in the duchy of Spoleto, and a bishop's see. Beside the cathedral, it contains three collegiate and six parish churches, and twelve convents. It is seated on the river Velino, near the lake Rieti, 37 miles N.E. of Rome. Lon. 13. 5 E. Lat. 42. 23 N.

RIFE. *a.* (ꝛyꝑe, Saxon; *riif*, Dutch.) Prevalent; abounding. It is now only used of epidemical distempers (*Arbuthnot*).

RI'FELY. *ad.* (from *rife.*) Prevalently; abundantly (*Knolles*).

RI'FENESS. *s.* (from *rife.*) Prevalence; abundance (*Arbuthnot*).

To RI'FLE. *v. a.* (*riffer*, *rifler*, Fr.) 1. To rob; to pillage; to plunder (*South*). 2. To take away; to seize as pillage (*Pope*).

RIFLE, a fire-arm which has the inside of its barrel cut with from three to nine or ten spiral grooves, so as to make it resemble a female screw, varying from a common screw only in this, that its grooves or rifles are less deflected, and approach more to a right line; it being now usual for the grooves with which the best rifled barrels are cut, to take about one whole turn in a length of thirty inches. The number of these grooves differs according to the size of the barrel and fancy of the workman; and their depth and width are not regulated by any invariable rule. See GUN, GUNNERY, and FOWLING-PIECE.

RI'FLER. *s.* (from *rifle.*) Robber; plunderer; pillager.

RIFT. *s.* (from *rive.*) A cleft; a breach; an opening (*Dryden*).

To RIFT. *v. a.* (from the noun.) To cleave; to split (*Pope*).

To RIFT. *v. n.* 1. To burst; to open (*Ba.*). 2. (*raver*, Danish.) To belch; to break wind.

RIG. *s.* *Rig*, ridge, seems to signify the top of a hill falling on each side; from the Saxon, hꝛiꝛ; and the Islandic, *hriggur*, both signifying a back (*Gibson*).

To RIG. *v. a.* (from *rig*, or *ridge*, the back.) 1. To dress; to accoutre (*L'Estrange*). 2. To fit with tackling (*South*).

RIGA, a government of Russia. See LIVONIA.

RIGA, a strong town of Russia, capital of the government of Livonia, and next to Petersburg the most commercial place in the empire. It stands on the river Dwina, five miles from its mouth, in a gulf of the Baltic, called the Gulf of Riga, or Livonia. The trade is chiefly carried on by foreign merchants, who are resident here, and those belonging to an English factory enjoy the greatest share of the commerce. The principal exports are corn, hemp, flax, iron, timber, masts, leather, and tallow. Within the fortifications are 9000 inhabitants, and in the suburbs 15,000, beside a garrison of 1000 men. Here is a floating wooden bridge, over the Dwina, 2600 feet long and 40 broad: in winter, when the ice sets in, it is removed; and in spring it is replaced. Riga is 220 miles N.E. of Konigsberg, and 310 S.W. of Petersburg. Lon. 24. 15 E. Lat. 56. 50 N.

RIGADOON. A lively kind of dance performed in figure by a man and woman, and the tune of which is always written in triple time. The rigadoon was borrowed originally from Provence. The word is formed from the French word *rigadon*, signifying the same thing.

RIGATION. *s.* (*rigatio*, Latin.) The act of watering.

RI'GGER. *s.* (from *rig*.) One that rigs or dresses.

RIGGING OF A SHIP, is all her cordage and ropes, belonging to her masts, yards, &c. A ship is said to be well rigged, when all her ropes are of a fit size and proportion: and she is said to be over-rigged, when her ropes are too large, which is of great prejudice to her sailing, and is apt to make her heel.

RI'GGISH. *a.* (from *rig*, an old word for a whore.) Wanton; whorish (*Shakspeare*).

To RI'GGLE. *v. a.* (properly to *wriggle*.) To move backward and forward, as shrinking from pain.

RIGHT. *a.* (ɲiȝt, Sax. *recht*, Dutch.) 1. Fit; proper; becoming; suitable (*Atterbury*). 2. Rightful; justly claiming (*Locke*). 3. True; not erroneous; not wrong (*Locke*). 4. Not mistaken; passing a true judgment (*Shaks.*). 5. Just; honest; equitable (*Psalms*). 6. Happy; convenient (*Addison*). 7. Not left (*Brown*). 8. Straight; not crooked (*Locke*). 9. Perpendicular; direct.

RIGHT. *interj.* An expression of approbation (*Pope*).

RIGHT. *ad.* 1. Properly; justly; exactly; according to truth or justice (*Locke*). 2. According to art or rule (*Roscommon*). 3. In a direct line (*Bacon*). 4. In a great degree; very: obsolete (*Shakspeare*). 5. It is still used in titles: as, right *honourable*; right *reverend* (*Peacham*).

RIGHT. *s.* 1. Not wrong (*Milton*). 2. Justice; not injury (*Tillotson*). 3. Freedom from guilt; goodness (*Cowley*). 4. Freedom from errour (*Prior*). 5. Just claim (*Milton*). 6. That which justly belongs to one (*Temple*). 7. Property; interest (*Dryden*). 8. Power; prerogative (*Tillotson*). 9. Immunity; privilege (*Clarendon*). 10. The side not left (*Milton*). 11. *To* RIGHTS. In a direct line; straight (*Woodward*). 12. *To* RIGHTS. With deliverance from errour (*Woodward*).

To RIGHT. *v. a.* To do justice to; to establish in possessions justly claimed; to relieve from wrong (*Waller*).

RIGHT, in geometry, signifies the same with straight; thus, a straight line is called a right one. As for right angle, right ascension, right cone, right descension, right sine, right sphere, &c. they are explained under the articles ANGLE, ASCENSION, &c.

RIGHT is a title conferred, 1. Together with reverend, upon all bishops. 2. Together with honourable, upon earls, viscounts, and barons. 3. By courtesy, together with honourable, upon the sons of dukes, marquisses, and the eldest sons of earls. 4. Together with honourable, to the speaker of the house of commons; but to no other commoner excepting those who are members of his majesty's most honourable privy-council; and the three lord mayors of London, York, and Dublin, and the lord provost of Edinburgh, during their office. See HONOURABLE and PROVOST.

RIGHT (Hereditary). See HEREDITARY.

RIGHT is a word which, in the propriety of the English language, is used sometimes as an adjective and sometimes as a substantive. As an adjective it is nearly of the same import with *fit*, *suitable*, *becoming*, *proper*; and whilst it expresses a quality, it indicates a relation. Thus, when we say that an action is *right*, we must not only know the nature of the action, but, if we speak intelligibly, must also perceive its relation to the end for which it was performed; for an action may be right with one end in view which would be wrong with another. The conduct of that general would be right, who, to save an army that could not be otherwise saved, should place a small detachment in a station where he knew they would all be inevitably cut off; but his conduct would be very wrong were he to throw away the life of a single individual for any purpose, however important, which he knew how to accomplish without such a sacrifice.

Many philosophers have talked of actions being right and wrong in the abstract without regard to their natural consequences; and converting the word into a substantive, they have fancied an eternal rule of right, by which the morality of human conduct is in every particular case to be tried. But in these phrases we can discover no meaning. Whatever is right must be so on some account or other; and whatever is fit, must be fit for some purpose. When he who rests the foundation of virtue on the moral sense, speaks of an action being right, he must mean that it is such as, through the medium of that sense, will excite complacency in the mind of the agent, and gain to him the general approbation of mankind. When he who rests moral obligation on the will of God, speaks of some actions as right and others as wrong, he must mean that the former are agreeable to the divine will, however made known to men, and the latter disagreeable to it; and the man who deduces the law of virtue from what he calls the fitness of things, must have some end in view, for which things are fit, and denominate actions right or wrong as they tend to promote or counteract that end.

But the word right, used as a substantive, has in common as well as in philosophical language a signification which at first view appears to be very different from this. It denotes a just claim or an honest possession. Thus we say, a father has a right to reverence from his children, a husband to the love and fidelity of his wife, and a king to the allegiance of his subjects. But if we trace these rights to their source, we shall find that they are all laws of moral obligation, and that they are called rights only because it is agreeable to the will of God, to the instinctive dictates of the moral sense, or to the fitness of things, if such a phrase has any meaning, that children reverence their parents, wives love their husbands, &c.

RIGHT, *jus*, in law, signifies not only a property, for which a writ of right lies, but also any title or claim, either by virtue of a condition, mortgage, or the like, for which no action is given by law, but only an entry.

Such are *jus proprietatis*, a right of property; *jus possessionis*, a right of possession; and *jus*

proprietatis et possessionis, a right both of property and possession.

This last was formerly called *jus duplicatum*. As, if a man be disseised of an acre of land, the disseisee has jus proprietatis; the disseisor hath jus possessionis; and, if the disseisee release to the disseisor, he hath jus proprietatis et possessionis.

RIGHTS (Bill of), in law, is a declaration, delivered by the lords and commons to the prince and princess of Orange, 13 February, 1688; and afterwards enacted in parliament, when they became king and queen. This declaration sets forth, that king James II. did, by the assistance of divers evil counsellors, endeavour to subvert the laws and liberties of this kingdom, by exercising a power of dispensing with and suspending of laws; by levying money for the use of the crown, by pretence of prerogative, without consent of parliament; by prosecuting those who petitioned the king, and discouraging petitions; by raising and keeping a standing army, in time of peace; by violating the freedom of election of members to serve in parliament; by violent prosecutions in the court of king's bench; and causing partial and corrupt jurors to be returned on trials, excessive bail to be taken, excessive fines to be imposed, and cruel punishments inflicted; all which were declared to be illegal. And the declaration concludes in these remarkable words: "And they do claim, demand, and insist upon, all and singular the premises, as their undoubted rights and liberties." And the act of parliament itself (1 W. & M. stat. 2. cap. 2.) recognizes "all and singular the rights and liberties asserted and claimed in the said declaration to be the true, ancient, and indubitable rights of the people of this kingdom."

RI'GHT-HAND. *s.* The hand chiefly made use of by mankind (*Shakspeare*).

RI'GHTEOUS. *a.* (ꝛihtpiꝛe, Saxon.) 1. Just; honest; virtuous; uncorrupt (*Gen.*). 2. Equitable; agreeing with right (*Dryden*).

RI'GHTEOUSLY. *ad.* (from *righteous.*) Honestly; virtuously (*Dryden*).

RI'GHTEOUSNESS. *s.* (from *righteous.*) Justice; honesty; virtue; goodness (*Hooker*).

RI'GHTFUL. *a.* (*right* and *full.*) 1. Having the right; having the just claim (*Sh.*). 2. Honest; just; agreeable to justice (*Prior*).

RI'GHTFULLY. *ad.* According to right; according to justice (*Dryden*).

RI'GHTFULNESS. *s.* (from *rightful.*) Moral rectitude (*Sidney*).

RI'GHTLY. *ad.* (from *right.*) 1. According to truth or justice; properly; suitably; not erroneously (*Milton*). 2. Honestly; uprightly (*Shakspeare*). 3. Exactly (*Dryden*). 4. Straightly; directly (*Ascham*).

RI'GHTNESS. *s.* (from *right.*) 1. Conformity to truth; exemption from being wrong; rectitude (*Rogers*). 2. Straightness (*Bacon*).

RI'GID. *a.* (*rigide*, French; *rigidus*, Lat.) 1. Stiff; not to be bent; unpliant (*Ray*). 2. Severe; inflexible (*Denham*). 3. Unremitted; unmitigated (*Milton*). 4. Sharp; cruel (*Philips*).

RIGI'DITY. *s.* (*rigidité*, French.) 1. Stiffness (*Arbuthnot*). 2. Stiffness of appearance; want of easy or airy elegance (*Wotton*).

RI'GIDLY. *ad.* (from *rigid.*) 1. Stiffly; unpliantly. 2. Severely; inflexibly; without remission; without mitigation.

RI'GIDNESS. *s.* (from *rigid.*) Stiffness; severity; inflexibility.

RI'GLET. *s.* (*regulet*, French.) A flat thin square piece of wood (*Moxon*).

RI'GOL. *s.* A circle. In *Shakspeare*, a diadem.

RIGOLL, or REGALS, a kind of musical instrument, consisting of several sticks bound together, only separated by beads. It is tolerably harmonious, being well struck with a ball at the end of a stick. Such is the account which Grassineau gives of this instrument. Skinner, upon the authority of an old English dictionary, represents it as a clavichord, or clarichord; possibly founding his opinion on the nature of the office of the tuner of the regals, who still subsists in the establishment of the king's chapel at St. James's, and whose business is to keep the organ of the chapel royal in tune; and not knowing that such wind instruments as the organ need frequent tuning, as well as the clavichord and other stringed instruments. Sir Henry Spelman derives the word rigoll from the Italian *rigabello*, a musical instrument, anciently used in churches instead of the organ. Walther, in his description of the regal, makes it to be a reed-work in an organ, with metal and also wooden pipes and bellows adapted to it. And he adds, that the name of it is supposed to be owing to its having been presented by the inventor to some king.—From an account of the regal used in Germany, and other parts of Europe, it appears to consist of pipes and keys on one side, and the bellows and wind-chest on the other. We may add, that lord Bacon (Nat. Hist. cent. ii. § 102.) distinguishes between the regal and organ, in a manner which shows them to be instruments of the same class. Upon the whole there is reason to conclude, that the regal or rigoll was a pneumatic, and not a stringed instrument.

Mersennus relates, that the Flemings invented an instrument, *les regales de bois*, consisting of 17 cylindrical pieces of wood, decreasing gradually in length, so as to produce a succession of tones and semitones in the diatonic series, which had keys, and was played on as a spinet; the hint of which, he says, was taken from an instrument in use among the Turks, consisting of 12 wooden cylinders, of different lengths, strung together, which being suspended and struck with a stick, having a ball at the end, produced music. Hawkins's Hist. Mus. vol. ii. p. 449.

RI'GOUR. *s.* (*rigor*, Lat.) 1. Cold; stiffness (*Milton*). 2. A convulsive shuddering with sense of cold (*Arbuthnot*). 3. Severity; sternness; want of condescension to others (*Den.*). 4. Severity of life; voluntary pain; austerity

(*Sprat*). 5. Strictness; unabated exactness (*Glanville*). 6. Rage; cruelty; fury (*Spens.*). 7. Hardness; not flexibility; solidity; not softness (*Dryden*).

RI'GOROUS. *a.* (from *rigour.*) 1. Severe; allowing no abatement (*Rogers*). 2. Exact; scrupulously nice.

RI'GOROUSLY. *ad.* 1. Severely; without tenderness or mitigation (*Milton*). 2. Exactly; scrupulously; nicely.

RILL. *s.* (*rivulus*, Lat.) A small brook; a little streamlet (*Milton*).

To RILL. *v. n.* (from the noun.) To run in small streams (*Prior*).

RI'LLET. *s.* (corrupted from *rivulet.*) A small stream (*Carew*).

RIM. *s.* (rima, Saxon.) 1. A border; a margin (*Carew*). 2. That which encircles something else (*Brown*).

RIMA. A fissure or opening; as the rima laryngis, rima vulvæ.

RIMA GLOTTIDIS. The opening of the glottis, through which the air passes in and out of the lungs.

RIME. *s.* (hrim, Saxon.) 1. Hoar frost (*Bacon*). 2. (*rima*, Lat.) A hole; a chink: not used (*Brown*).

To RIME. *v. n.* To freeze with hoar frost.

RIMINI, a town of Italy, in Romagna, with an old castle, a strong tower, and many remains of antiquity. The sea having receded from this city for some centuries, its harbour now will admit only small vessels. It is seated in a fertile plain, at the mouth of the Marrechia, on the gulf of Venice, 28 miles S.E. of Ravenna, and 145 N. by E. of Rome. Lon. 12. 34 E. Lat. 4. 4 N.

To RI'MPLE. *v. a.* To rumple; to pucker; to contract into corrugations (*Wiseman*).

RIMOUS, in botany. Chinked. Abounding in cracks, clefts, or chinks; as the outer bark of some trees.

RIMULA. (*rima*, a fissure.) A small fissure.

RI'MY. *a.* (from *rime.*) Steamy; foggy; full of frozen mist (*Harvey*).

RINÆUS. See COMPRESSOR NARIS.

RIND. *s.* (rind, Saxon; *rinde*, Dutch.) Bark; husk (*Dryden*).

To RIND. *v. n.* (from the noun.) To decorticate; to bark; to husk.

RING. *s.* (hring, Saxon.) 1. A circle; an orbicular line (*Newton*). 2. A circle of gold or some other matter worn as an ornament (*Addison*). 3. A circle of metal to be held by (*Swift*). 4. A circular course (*Smith*). 5. A circle made by persons standing round (*Hayward*). 6. A number of bells harmonically tuned (*Prior*). 7. The sound of bells or any other sonorous body (*Milton*). 8. A sound of any kind (*Bacon*).

RING, an ornament of gold or silver, of a circular figure, and usually worn on the finger. The episcopal ring (which makes a part of the pontifical apparatus, and is esteemed a pledge of the spiritual marriage between the bishop and his church) is of very ancient standing. The fourth council of Toledo, held in 633, appoints, that a bishop condemned by one council, and found afterwards innocent by a second, shall be restored, by giving him the ring, staff, &c. From bishops, the custom of the ring has passed to cardinals, who are to pay a very great sum *pro jure annuli cardinalitii.*

RINGS. The antiquity of rings is known from Scripture and profane authors. Judah left his ring or signet with Tamar (Gen. xxxviii. 18.) When Pharaoh committed the government of all Egypt to Joseph, he took his ring from his finger, and gave it to Joseph (Gen. xli. 42.) After the victory that the Israelites obtained over the Midianites, they offered to the Lord the rings, the bracelets, and the golden necklaces, and the ear-rings, that they had taken from the enemy (Numb. xxxi. 50.) The Israelitish women wore rings not only on their fingers, but also in their nostrils and their ears. St. James distinguishes a man of wealth and dignity by the ring of gold that he wore on his finger (James ii. 2.). At the return of the prodigal son, his father orders him to be dressed in a new suit of clothes, and to have a ring put upon his finger (Luke xv. 22.). When the Lord threatened king Jeconiah with the utmost effects of his anger, he tells him, that though he wore the signet or ring upon his finger, yet he should be torn off (Jer. xxii. 24.).

The ring was used chiefly to seal with; and the Scripture generally puts it in the hands of princes and great persons; as the king of Egypt, Joseph, Ahaz, Jezebel, king Ahasuerus, his favourite Haman, Mordecai, who succeeded Haman in his dignity, king Darius (1 Kings xxi. 8.; Esther iii. 10, &c.; Dan. vi. 17.) The patents and orders of these princes were sealed with their rings or signets; and it was this that secured to them their authority and respect. See the article SEAL.

Some of our readers will perhaps be pleased with the following motto for a ring presented as a token of affection, in nine languages.

1. Γλυκαινω Απουσιαν, - - - - Greek.
2. Edulco absentiam, - - - - Latin.
3. Adulzo la ausencia, - - - Spanish.
4. Adoço a ausencia, - - - - Portuguese.
5. Addolisco l'assenza, - - - Italian.
6. I'adoucis l'absence, - - - French.
7. Ich verüsse die abwesenheit - German.
8. Ize versoet (*verzaot*) d'afwezigheyt, - - - - - Dutch.
9. I soften (*sweeten*) absence, - English.

RING, in astronomy and navigation, an instrument used for taking the sun's altitude, &c. It is usually of brass, about nine inches diameter, suspended by a little swivel, at the distance of 45° from the point of which is a perforation, which is the centre of a quadrant of 90° divided in the inner concave surface.

To use it, let it be held up by the swivel, and turned round to the sun, till his rays, falling through the hole, make a spot among the degrees, which marks the altitude required.

This instrument is preferred before the astro-

labe, because the divisions are here larger than on that instrument.

RING OF SATURN, is a thin, broad, opaque circular arch, encompassing the body of that planet, like the wooden horizon of an artificial globe, without touching it, and appearing double, when seen through a good telescope.

This ring was first discovered by Huygens, who, after frequent observation of the planet, perceived two lucid points, like ansæ or handles, arising out from the body in a right line. Hence as in subsequent observations he always found the same appearance, he concluded that Saturn was encompassed with a permanent ring; and accordingly produced his New System of Saturn, in 1659. However, Galileo first discovered that the figure of Saturn was not round.

Huygens makes the space between the globe of Saturn and the ring equal to the breadth of the ring, or rather more, being about 22000 miles broad; and the greatest diameter of the ring, in proportion to that of the globe, as 9 to 4. But Mr. Pound, by an excellent micrometer applied to the Huygenian glass of 123 feet, determined this proportion, more exactly, to be as 7 to 3.

Observations have also determined, that the plane of the ring is inclined to the plane of the ecliptic in an angle of 30 degrees; that the ring probably turns, in the direction of its plane, round its axis, because when it is almost edgewise to us, it appears rather thicker on one side of the planet than on the other; and the thickest edge has been seen on different sides at different times: the sun shines almost 15 of our years together on one side of Saturn's ring without setting, and as long on the other in its turn; so that the ring is visible to the inhabitants of that planet for almost 15 of our years, and as long invisible, by turns, if its axis has no inclination to its ring; but if the axis of the planet be inclined to the ring, ex. gr. about 30 degrees, the ring will appear and disappear once every natural day to all the inhabitants within 30 degrees of the equator, on both sides, frequently eclipsing the sun in a Saturnian day. Moreover, if Saturn's axis be so inclined to his ring, it is perpendicular to his orbit; by which the inconvenience of different seasons to that planet is avoided.

Later observations have thrown much more light upon this curious phænomenon, especially respecting its dimensions, and rotation, and division into two or more parts. De la Lande and De la Place say, that Cassini saw the breadth of the ring divided into two separate parts that are equal, or nearly so. Mr. Short assured M. De la Lande, that he had seen many divisions upon the ring, with his 12 feet telescope. And Mr. Hadley, with an excellent 5½ feet reflector, saw the ring divided into two parts. Several excellent theories have been given in the French memoirs, particularly by De la Place, contending for the division of the ring into many parts. But finally the observations of Dr. Herschel, in several volumes of the Philos. Trans seem to confirm the division into two concentric parts only. The dimensions of these two rings, and the space between them, he states in the following proportion to each other.

	Miles.
Inner diam. of smaller ring - -	146345
Outside diam. of ditto - - -	184393
Inner diam. of larger ring - -	190248
Outside diam. of ditto - - -	204883
Breadth of the inner ring - - -	20000
Breadth of the outer ring - - -	7200
Breadth of the vacant space - -	2839

Ring revolves in its own plane, in 10h 32′15″ ·4.

So that the outside diameter of the larger ring is almost 26 times the diameter of the earth.

Dr. Herschel adds, Some theories and observations, of other persons, "lead us to consider the question, whether the construction of this ring is of a nature so as permanently to remain in its present state? or whether it be liable to continual and frequent changes, in such a manner as in the course of not many years, to be seen subdivided into narrow slips, and then again as united into one or two circular planes only. Now, without entering into a discussion, the mind seems to revolt, even at first sight, against an idea of the chaotic state in which so large a mass as the ring of Saturn must needs be, if phænomena like these can be admitted. Nor ought we to indulge a suspicion of this being a reality, unless repeated and well-confirmed observations had proved, beyond a doubt, that this ring was actually in so fluctuating a condition." But from his own observations he concludes, "It does not appear to me that there is a sufficient ground for admitting the ring of Saturn to be of a very changeable nature, and I guess that its phænomena will hereafter be so fully explained, as to reconcile all observations. In the mean while, we must withhold a final judgment of its construction, till we can have more observations. Its division however into two very unequal parts, can admit of no doubt." See Philos. Trans. vol. 80, pa. 4, 481, &c. and the vol. for 1792, pa. 1, &c. also Hist. de l'Acad. des Scienc. de Paris, 1787, pa. 249, &c. See also our article ASTRONOMY.

RINGS OF COLOURS, in optics, a phænomenon first observed in thin plates of various substances, by Boyle, and Hook, but afterwards more fully explained by sir Isaac Newton. Mr. Boyle having exhibited a variety of colours in colourless liquors, by shaking them till they rose in bubbles, as well as in bubbles of soap and water, and also in turpentine, procured glass blown so thin as to exhibit similar colours; and he observes, that a feather of a proper shape and size, and also a black ribband, held at a proper distance between his eye and the sun, showed a variety of little rainbows, as he calls them, with very vivid colours. Dr. Hook, about nine years after the publication of Mr. Boyle's Treatise on Colours, exhibited the coloured bubbles of soap and water, and observed, that though at first it appeared white

and clear, yet as the film of water became thinner, there appeared upon it all the colours of the rainbow. He also described the beautiful colours that appear in thin plates of Muscovy glass; which appeared, through the microscope, to be ranged in rings surrounding the white specks or flaws in them, and with the same order of colours as those of the rainbow, and which were often repeated ten times. He likewise took two thin pieces of glass, ground plane and polished, and putting them one upon another, pressed them till there began to appear a red coloured spot in the middle; and pressing them closer, he observed several rings of colours encompassing the first place, till, at last, all the colours disappeared out of the middle of the circles, and the central spot appeared white. The first colour that appeared was red, then yellow, then green, then blue, then purple; then again red, yellow, green, blue, and purple; and again in the same order; so that he sometimes counted nine or ten of these circles, the red immediately next to the purple; and the last colour that appeared before the white was blue; so that it began with red, and ended with purple. These rings, he says, would change their places, by changing the position of the eye, so that the glasses remaining the same, that part which was red in one position of the eye, was blue in a second, green in the third, &c.

Sir Isaac Newton, having demonstrated that every different colour consists of rays which have a different and specific degree of refrangibility, and that natural bodies appear of this or that colour, according to their disposition to reflect this or that species of rays, pursued the hint suggested by the experiments of Dr. Hook, with regard to thin transparent substances. Upon compressing two prisms hard together, in order to make their sides touch one another, he observed, that in the place of contact they were perfectly transparent, which appeared like a dark spot, and when it was looked through, it seemed like a hole in that air, which was formed into a thin plate, by being impressed between the glasses. When this plate of air, by turning the prisms about their common axis, became so little inclined to the incident rays, that some of them began to be transmitted, there arose in it many slender arcs of colours, which increased, as the motion of the prisms was continued, and bended more and more about the transparent spot, till they were completed into circles, or rings, surrounding it; and afterwards they became continually more and more contracted. He then took two object-glasses of a telescope, the one plano-convex, the other a little convex on both sides; he placed one of the faces of this upon the plane face of the former, and pressed the two glasses at first gently, and then, by degrees, more closely against one another. The effect of this gradual pressure was an appearance in the plate of air between the glasses of different coloured circles, which had the point of contact for the common centre, and which increased in number according to the greater degree of pressure, in such a manner that the circle which appeared last always surrounded the point of contact, and on a still further pressure extended in circumference while it contracted itself breadthwise, to form a kind of ring round a new circle that arose near its middle. The pressure having been carried to a certain term, Newton stopped and observed as follows. At the point of contact was a black spot that was encompassed by several series of colours. The order of the colours from the centre to the borders of the two glasses was this: in the first series, blue, white, yellow, and red; in the second, violet, blue, green, yellow, and red; in the third, purple, blue, green, yellow, and red; in the fourth, green and red; in the fifth, greenish blue and red; in the sixth, greenish blue, and pale red; in the seventh, greenish blue, and reddish white. Beyond this number, the tints of which were regularly paler, the colour became white. Newton measured the diameters of the annular bands, formed of these different colours, by taking the points where they had most lustre; and he found that the squares of those diameters were to one another as the terms of the ascending progression, 1, 3, 5, 7, 9, 11, &c.; from which it results, that the intervals between the two glasses, relatively to the corresponding points, followed the same progression. From these proportions, it was merely necessary to ascertain the absolute length of a single diameter, to know the lengths of all the others, as well as the different thickness of the plates of air at the points where the different colours were seen. He drew up a table of these degrees of thickness, by which it appears, that the most intense blue, for example, that of the first series, is expressed by a thickness of 0.000024 of an inch, supposing the visual ray to be nearly perpendicular to the two glasses. Sir Isaac Newton having measured also the diameters of the rings at the intermediate places where the colours were obscure, found that their squares were to one another as the even numbers, 2, 4, 6, 8, 10, 12, &c.; and hence the intervals between the glasses, at the corresponding points, observed a similar progression. The diameters of the rings increased or diminished, as the visual ray was more or less inclined to the surface of the two glasses, so that the greatest contraction took place when the eye was situated perpendicularly above the glasses. The diameters also retained the same proportions to one another.

From other curious observations on these rings, made by different kinds of light thrown upon them, he inferred, that the thicknesses of the air between the glasses, where the rings are successively made, by the limits of the seven colours, red, orange, yellow, green, blue, indigo, and violet, in order, are one to another as the cube roots of the squares of the eight lengths of a chord, which sound the notes in an octave, sol, la, fa, sol, la, mi, fa, sol; that is, as the cube roots of the squares of the numbers 1, $\frac{8}{9}$, $\frac{5}{6}$, $\frac{3}{4}$, $\frac{2}{3}$, $\frac{3}{5}$, $\frac{9}{16}$, $\frac{1}{2}$. These rings appeared of that prismatic colour, with which they were illumi-

nated, and by projecting the prismatic colours immediately upon the glasses, he found that the light, which fell on the dark spaces between the coloured rings, was transmitted through the glasses without any change of colour. From this circumstance he thought that the origin of these rings is manifest; because the air between the glasses is disposed according to its various thickness, in some places to reflect, and in others to transmit the light of any particular colour, and in the same place to reflect that of one colour, where it transmits that of another.

In examining the phænomena of colours made by a denser medium surrounded by a rarer, such as those which appear in plates of Muscovy glass, bubbles of soap and water, &c. the colours were found to be much more vivid than the others, which were made with a rarer medium surrounded by a denser. From the preceding phænomena it is an obvious deduction, that the transparent parts of bodies, according to their several series, reflect rays of one colour and transmit those of another; on the same account that thin plates, or bubbles, reflect or transmit those rays; and this sir Isaac Newton supposed to be the reason of all their colours. Another inference is, that the particles even of those bodies which we call opaque are in reality transparent, which persons who are in the habit of using the microscope must continually perceive. See NEWTON'S OPTICS: see also COLOUR, &c.

To RING. *v. a.* pret. and part. pass. *rung*. (hpinzan, Saxon.) 1. To strike a bell or any other sonorous body, so as to make it sound (*Shakspeare*). 2. (from *ring*.) To encircle (*Shakspeare*). 3. To fit with rings (*Shaksp.*). 4. To restrain a hog by a ring in his nose.

To RING. *v. n.* 1. To sound as a bell or sonorous metal (*Shakspeare*). 2. To practise the art of making music with bells (*Holder*). 3. To sound; to resound (*Locke*). 4. To utter as a bell (*Shakspeare*). 5. To tinkle (*Dryden*). 6. To be filled with a bruit or report (*South*).

RING-BONE, a large swelling on the lower part of the pastern, which generally reaches half way round the fore-part, and, from its resemblance to a ring, has this denomination. A ring-bone has an affinity to a bone-spavin; and, for the most part, proceeds from the same cause. The external cause of a ring-bone is often a strain in the pastern, from hard riding on dry roads; or owing to the pastern having been wrung in deep clayey roads, either in travelling or at grass. These often produce ring-bones. Yet some horses are naturally subject to ring-bones, especially those that are large and bony about the pasterns. When a ring-bone appears upon a clean-limbed horse, it is seldom so dangerous as when it happens to horses that have large bones, and are fleshy in those parts; for when the swelling is removed, the stiffness often remains.

A ring-bone is always easier to cure when it appears distinct round the pastern, than when it spreads downwards towards the coronet; for then it is apt to affect the coffin-joint, if it does not derive its origin from some strain or defect in that joint originally; in which case the cure will be uncertain, and sometimes impracticable, when a callosity is produced under the round ligament that covers that joint, and even when it happens more externally; it proves also dangerous, when it unites with or spreads the ligamentous substance that joins the hoof to the flesh; it is apt to turn to a quittor, and in the end to form an ulcer under the hoof. A ring-bone that rises on the pastern is easily cured when it does not run down towards the coronet.

Gibson says, the ring-bones that appear on colts and young horses will often insensibly wear off of themselves, without the help of any application; but when the substance remains, there needs no other remedy besides blistering, unless when, by long continuance, it is grown to an obstinate hardness, and then it may require both blistering and firing. The swelling may proceed only from the tendons, which sometimes is not easy to be distinguished from a true ring-bone, except only that a true ring-bone is less painful, unless it proceed from the coffin-joint. In this case, blistering alone generally proves successful; and it is to be renewed two or three times, according to the urgency of the symptoms. But in a true ring-bone, where the substance is hard, like a piece of flint, and altogether insensible, and without pain, firing is the only thing to remove it.

RING-DOVE. See COLUMBA.

RING-OUZEL. See TURDUS.

RING-TAIL (Cayenne). See FALCO.

RING-WORM, species of herpes. See HERPES.

RI'NGER. *s.* (from *ring*.) He who rings.

RINGLEA'DER. *s.* (*ring* and *leader*.) The head of a riotous body (*Bacon*).

RI'NGLET. *s.* (diminutive of *ring*.) 1. A small ring (*Pope*). 2. A circle (*Shakspeare*). 3. A curl (*Milton*).

RI'NGSTREAKED. *a.* (*ring* and *streaked*.) Circularly streaked (*Genesis*).

RINGKIOPING, a seaport of Denmark, in N. Jutland. It has a considerable trade with Holland and Norway, and is seated on a gulf of the German ocean, 43 miles S.W. of Wiburg, and 55 N.N.W. of Ripen. Lon. 8. 15 E. Lat. 56. 8 N.

RINGLEBEN, a town of Upper Saxony, in the principality of Eisenach, six miles N. of Erfurt, and 26 E.N.E. of Eisenach.

RINGSTED, a town of Denmark, in the isle of Zealand. It was formerly a city; and in the great church are interred several kings, and other persons of distinction. It is 30 miles S.W. of Copenhagen.

RINGWOOD, a town in Hampshire, with a market on Wednesday. It has a manufacture of worsted hose; and is famous for its strong beer and ale. It is seated on the Avon, 30 miles S.W. of Winchester, and 91 W. by S. of London.

To RINSE. *v. a.* (from *rein*, German, pure.) 1. To wash; to cleanse by washing

(*Shakspeare*). 2. To wash the soap out of clothes (*King*).

RI'NSER. *s.* (from *rinse.*) One that washes or rinses; a washer.

RINTLEN, or RINTELN, a town of Westphalia, in the county of Schawenburg, with a university. It is subject to the landgrave of Hesse-Cassel, and seated on the Weser, 15 miles S.E. of Minden, and 35 S.W. of Hanover. Lon. 9. 20 E. Lat. 52. 13 N.

RIO-DE-LA-HACHA, a small province of Terra Firma, in the form of a peninsula, between the gulf of Venezuela on the E. and a bay of the Caribbean Sea on the W. Rio-de-la-Hacha, the capital, is seated at the mouth of a river of the same name, 100 miles E. of St. Martha. Lon. 72. 34 W. Lat. 11. 30 N.

RIO-DE-LA-MADALENA, a river in Terra Firma, which rises in the mountains N. of Popayan, and running north, falls into the Caribbean sea, between Carthagena and St. Martha. It is also called Rio Grande.

RIO-DE-LA-PLATA. See PLATA.

RIO-DE-MIRANDO, a river of Spain, which rises in the mountains of Asturias, and separating that province from Galicia, enters the bay of Biscay, at Rivadeo.

RIO-GRANDE, a river of Africa, which runs from E. to W. through Negroland, and falls into the Atlantic Ocean, in 11° N. latitude.

RIO-GRANDE, a river in Brasil, which rises near the Atlantic Ocean, and runs W. into the Parana, being the principal branch of that river.

RIO-JANEIRO, a river which rises in the W. mountains of Brasil, and running E. through that country, falls into the Atlantic Ocean, at St. Sebastian.

RIO-JANEIRO, one of the richest provinces of Brasil, lying near the tropic of Capricorn, on a river of the same name. It produces cotton, sugar, coffee, cocoa, wheat, rice, pepper, and tobacco in great abundance. Vines grow in great perfection, but the grapes are not suffered to be pressed for wine. The Portuguese annually export hence gold, silver, and precious stones. St. Sebastian is the capital.

RIOM, an ancient town of France, in the department of Puy de Dome, seated on a hill, in a pleasant country, eight miles N.E. of Clermont, and 115 S. of Paris. Lon. 3. 13 E. Lat. 45. 54 N.

RIONS, a town of France, in the department of Gironne, seated on the Garonne, 18 miles S.E. of Bourdeaux.

RIOT, in law, the forcible doing of an unlawful thing, of a private nature, by three or more persons assembled together for that purpose; either with or without a common cause or quarrel: as if they beat a man, or hunt and kill game in another's park, chase, warren, or liberty; or do any other unlawful act with force and violence, or even do a lawful act, as removing a nuisance, in a violent and tumultuous manner.

The word is formed from the Latin *riota*, of *arietare*, to run at each other as rams do. Though, from an ancient Gaulish version of the Bible, quoted by Skinner, riot should rather seem originally to signify luxury and excess; whence our law riot might proceed; because these are frequently attended with quarrels.

The punishment of riots and routs, where a number of persons from three to eleven are concerned, is, by the common law, fine and imprisonment only; to which, in very enormous cases, the pillory has been sometimes superadded. And by the stat. 13 Hen. IV. cap. 7. any two justices, together with the sheriff or under-sheriff of the county, may come with the posse comitatus, if need be, and suppress any such riot, assembly, or rout, and arrest the rioters, and record upon the spot the nature and circumstances of the whole transaction, which record alone shall be a sufficient conviction of the offenders; and it is held that any battery, wounding, or killing the rioters, that may happen in suppressing the riot, is justifiable. The riotous assembling of twelve persons or more, and not dispersing upon proclamation, was first made high treason by stat. 3 & 4 Edw. VI. cap. 5. but repealed by stat. 1 Mar. cap. 1. Nevertheless the offence was made a single felony by 1 Mar. stat. 2. cap. 12. and by 1 Eliz. cap. 16. with whom the law expired. However, it was revived, in order to support the execution of the act of settlement, and made perpetual by 1 Geo. I. cap. 5. which enacts, that if any twelve persons are unlawfully assembled to the disturbance of the peace, and any one justice of the peace, sheriff, under-sheriff, or mayor of a town, shall think proper to command them by proclamation to disperse, if they contemn his orders, and continue together for one hour afterwards, such contempt shall be felony without benefit of clergy. And farther, if the reading of the proclamation be by force opposed, or the reader be in any manner wilfully hindered from the reading of it, such opposers and hinderers are felons, without benefit of clergy; and all persons to whom such proclamation ought to have been made, and knowing of such hindrance, and not dispersing, are felons, without benefit of clergy. And the act indemnifies the peace officers, and their assistants, if they kill any of the mob in endeavouring to disperse them. Moreover, if any persons, so riotously assembled, begin, even before proclamation, to pull down any church, chapel, meeting-house, dwelling-house, or out-houses, they shall be felons, without benefit of clergy. Blackst. Comm. book iv. chap. xi.

To run RIOT. To move or act without control or restraint (*Swift*).

To RI'OT. *v. n.* (*riotter*, old French.) 1. To revel; to be dissipated in luxurious enjoyments (*Daniel*). 2. To luxuriate; to be tumultuous (*Pope*). 3. To banquet luxuriously. 4. To raise a sedition or uproar.

RI'OTER. *s.* (from *riot.*) 1. One who is dissipated in luxury. 2. One who raises an uproar or sedition.

RI'OTISE. *s.* (from *riot.*) Dissoluteness; luxury: obsolete (*Spenser*).

RI'OTOUS. *a.* (*riotteux*, French.) 1. Luxurious; wanton; licentiously festive (*Brown*). 2. Seditious; turbulent.

RI'OTOUSLY. *ad.* 1. Luxuriously; with licentious luxury (*Eccles.*). 2. Seditiously; turbulently.

RI'OTOUSNESS. *s.* (from *riotous.*) The state of being riotous.

To RIP. *v. a.* (hrýpan, Saxon.) 1. To tear; to lacerate; to cut asunder by a continued act of the knife, or of other force (*Dryden*). 2. To take away by laceration or cutting (*Shak.*). 3. To disclose; to search out; to tear up; to bring to view (*Clarendon*).

RIPA TRANSONE, a populous and strong town of Italy, in the marquisate of Ancona, with a bishop's see, five miles W. of the gulf of Venice, and eight S. of Fermo. Lon. 13. 50 E. Lat. 42. 59 N.

RIPE. *a.* (ripe, Saxon; *rijp*, Dutch.) 1. Brought to perfection in growth; mature (*Milton*). 2. Resembling the richness of fruit (*Shakspeare*). 3. Complete; proper for use (*Shakspeare*). 4. Advanced to the perfection of any quality (*Dryden*). 5. Finished; consummate (*Hooker*). 6. Brought to the point of taking effect; fully matured (*Addison*). 7. Fully qualified by gradual improvement.

To RIPE. *v. n.* (from the adj.) To ripen; to grow ripe. *Ripen* is now used (*Donne*).

To RIPE. *v. a.* To mature; to make ripe (*Shakspeare*).

RI'PELY. *ad.* (from *ripe.*) Maturely; at the fit time (*Shakspeare*).

To RI'PEN. *v. n.* (from *ripe.*) To grow ripe; to be matured (*Bacon*).

To RI'PEN. *v. a.* To mature; to make ripe.

RIPEN, a seaport of Denmark, in N. Jutland, capital of a diocese of the same name, with a bishop's see, a castle, two colleges, and a public library. The tombs of several kings of Denmark are in the cathedral, which is a very handsome structure. The harbour is at a small distance, at the mouth of the river Nipsaa, in a country which supplies the best beeves in Denmark. It is 55 miles N.W. of Sleswick, and 60 S. by W. of Wiburg. Lon. 9. 0 E. Lat. 55. 25 N.

RI'PENESS. *s.* (from *ripe.*) 1. The state of being ripe; maturity (*Sharp*). 2. Full growth (*Denham*). 3. Perfection; completion (*Hooker*). 4. Fitness; qualification (*Shaks.*).

RIPHEUS, a Trojan who joined Æneas the night that Troy was reduced to ashes, and was at last killed after making a great carnage of the Greeks. He is commended for his love of justice and equity.

RIPIENO. (Ital.) Full. This word is used by musicians in orchestral compositions, to distinguish those parts which are only occasionally introduced, to fill up and supply the chorus.

RIPIPHORA. In the entomology of Fabricius, a tribe of the coleopterous genus MORDELLA, which see.

RIPLEY, a town in the W. riding of Yorkshire, with a market on Monday, seated on the Nyd, 23 miles W.N.W. of York, and 221 N. by W. of London. Lon. 1. 30 W. Lat. 54. 4 N.

RI'PPER. *s.* (from *rip.*) One who rips; one who tears; one who lacerates.

To RI'PPLE. *v. n.* To fret on the surface, as water swiftly running.

RIPPON, an ancient borough in the W. riding of Yorkshire, with a market on Thursday. In its neighbourhood is the celebrated park of Studley, including the venerable remains of Fountain's Abbey. Rippon was once famous for its religious houses, and has now a collegiate church, adorned with three lofty spires. It is noted for its manufacture of hardwares, particularly spurs, and the market-place is one of the finest squares of the kind in England. It is governed by a mayor, sends two members to parliament, and is seated on the Ure, 28 miles N.W. of York, and 218 N.N.W. of London. Lon. 1. 29 W. Lat. 54. 11 N.

RI'PTOWEL. *s.* A gratuity, or reward given to tenants, after they had reaped their lord's corn (*Bailey*).

RIQUIER, an ancient town of France, in the department of Somme, seated on the Cardon, five miles N.E. of Abbeville, and 95 N. of Paris. Lon. 1. 59 E. Lat. 50. 10 N.

RISAGON. See CASSUMUNIAR.

RISBOROUGH, a town in Buckinghamshire, with a market on Saturday, 20 miles S. of Aylesbury, and 37 W.N.W. of London.

To RISE. *v. n.* pret. *rose*; part. *risen.* (risan, Saxon; *reisen*, Dutch.) 1. To change a jacent or recumbent, to an erect posture (*Shakspeare*). 2. To get up from rest (*Dan.*). 3. To get up from a fall (*Milton*). 4. To spring; to grow up (*Milton*). 5. To gain elevation of rank or fortune (*Shakspeare*). 6. To swell (*Leviticus*). 7. To ascend; to move upward (*Newton*). 8. To break out from below the horizon, as the sun (*Milton*). 9. To take beginning; to come into existence or notice (*Cowley*). 10. To begin to act (*Dryden*). 11. To appear in view (*Addison*). 12. To change a station; to quit a siege (*Knolles*). 13. To be excited; to be produced (*Otway*). 14. To break into military commotions; to make insurrections (*Pope*). 15. To be roused; to be excited to action (*Psalms*). 16. To make hostile attack (*Deuteronomy*). 17. To grow more or greater in any respect (*Milton*). 18. To increase in price (*Locke*). 19. To be improved (*Tatler*). 20. To elevate the style (*Roscommon*). 21. To be revived from death (*Matthew*). 22. To come by chance (*Spenser*). 23. To be elevated in situation (*Dryden*).

RISE. *s.* (from the verb.) 1. The act of rising, locally or figuratively. 2. The act of mounting from the ground (*Bacon*). 3. Eruption; ascent (*Dryden*). 4. Place that favours the act of mounting aloft (*Locke*). 5. Elevated place (*Denham*). 6. Appearance as of the sun in the east (*Waller*). 7. Increase in any respect. 8. Increase of price (*Temple*).

9. Beginning; original (*Locke*). 10. Elevation; increase of sound (*Bacon*).

RI'SEN. The participle of *To rise.*

RI'SER. *s.* (from *rise.*) One that rises (*Chapman*).

RISIBI'LITY. *s.* (from *risible.*) The quality of laughing (*Arbuthnot*).

RI'SIBLE. *a.* (*risibilis,* Latin.) 1. Having the faculty or power of laughing (*Government of the Tongue*). 2. Ridiculous; exciting laughter.

RISING LEAF, or PETIOLE, in botany. See ASSURGENT.

RISK. *s.* (*risque,* Fr.) Hazard; danger; chance of harm (*South*).

To RISK. *v. a.* (*risquer,* French.) To hazard; to put to chance; to endanger (*Addison*).

RI'SKER. *s.* (from *risk.*) He who risks (*Butler*).

RITE. *s.* (*rit,* French; *ritus,* Latin.) Solemn act of oblivion; external observance (*Hammond*).

RITORNELLO. (Ital.) In music, a term formerly much in use, and applied to the short introductory symphony to an air; that which was introduced between the strains to relieve the voice and improve the general effect, as also to that which succeeded the melody, and ascertained its conclusion. It appears from several passages in the Greek authors, that these ritornelli, or symphonies, were introduced in the ancient as well as in the modern music. The name by which the Greeks distinguished them was that of mesaulici, a figurative expression in the singular number, implying an entry or passage, leading to something else. Meibomius, speaking of the mesaulion, or symphony, calls it an interpiping, which clearly indicates that ritornelli, or intermediate symphonies, were anciently in use.

RITTENHOUSE (David), an eminent American. He received only a common education, and was bred a watchmaker, to which profession he united that of a farmer. In 1769 his astronomical talents recommended him to the notice of the American philosophical society, who desired him to observe the transit of Venus, which he did with surprising accuracy. Since the American war he successively filled the offices of treasurer of the state of Pennsylvania, and director of the national mint. Rittenhouse succeeded the venerable Franklin as president of the American philosophical society, which office he filled with high reputation. He died in 1796, aged 64.

RITTERSHUSIUS (Conrad), a German civilian, born in 1560, at Brunswick. He was profoundly learned in the Latin and Greek languages, and is said to have had both Hesiod and Homer by heart. He wrote several books on civil law, and edited the works of Oppian. He died in 1613.

RI'TUAL. *a.* (*rituel,* Fr.) Solemnly ceremonious; done according to some religious institution (*Prior*).

RI'TUAL. *s.* (from the adj.) A book in which the rites and observances of religion are set down (*Addison*).

RITUALIST. *s.* (from *ritual.*) One skilled in the ritual.

RI'VAGE. *s.* (French.) A bank; a coast: not in use (*Shakspeare*).

RI'VAL. *s.* (*rivalis,* Latin.) 1. One who is in pursuit of the same thing which another man pursues; a competitor (*Dryden*). 2. A competitor in love (*Sidney*).

RI'VAL. *a.* Standing in competition; making the same claim; emulous (*Shakspeare*).

To RI'VAL. *v. a.* (from the noun.) 1. To stand in competition with another; to oppose (*South*). 2. To emulate; to endeavour to equal or excel (*Dryden*).

To RI'VAL. *v. n.* To be competitors (*Shakspeare*).

RIVA'LITY. RI'VALRY. *s.* (*rivalitas,* Latin.) Competition; emulation (*Addison*).

RI'VALSHIP. *s.* (from *rival.*) The state or character of a rival.

To RIVE. *v. a.* pret. *rived*; part *riven.* (ꝛyꝛꝛ, broken, Saxon; *river,* French, to drive.) To split; to cleave; to divide by a blunt instrument; to force in disruption (*Howel*).

To RIVE. *v. n.* To be split; to be divided by violence (*Woodward*).

To RIVE, for *derive* or *direct* (*Shakspeare*).

To RI'VEL. *v. a.* (ȝeꝛuꝛleꝺ, Saxon.) To contract into wrinkles and corrugations (*Dryden*).

RI'VEN. The participle of *rive.*

RI'VER. *s.* (*riviere,* Fr. *rivus,* Latin.) A land current of water bigger than a brook (*Addison*).

RIVER, an inland current of water, formed by the confluence of brooks, small streams, or mountain torrents.

There are few parts of physical philosophy involved in more darkness than the origin of rivers, or rather of the water that constitutes them. It is perhaps most obvious, and certainly most usual in the present day to derive them from the descent of rain; and consequently to regard evaporation as their principal source. But is the process of evaporation equal to so prodigious an effect? and are those countries or places most remarkable for the number and extent of their rivers where there is the greatest proportion of evaporation?

If we may credit Mr. Williams, the evaporation from the surface of land covered with trees and other vegetables is one-third greater than from the surface of water; but this has not been confirmed by other philosophers. From his experiments it appears that in Bradford in New England the evaporation during 1772 amounted to 42.65 inches. But from the way that his experiments were conducted, the amount was probably too great. From an experiment of Dr. Watson made June 2, 1779, after a month's drought, it appears that the evaporation, from a square inch of a grass plat, amounted to 1.2 grains in an hour, or 28.8 in twenty-four hours, which is 0.061 of an inch. In another experiment, after there had been no rain for a week, the heat of the earth being 110°, the evaporation was found almost twice as great, or = 0.108 of an inch in the day: the mean of which two experiments is 0.084 inches,

amounting for the whole month of June to 2.62 inches. If we suppose this to bear the same proportion to the whole year, that the evaporation in Dr. Dobson's experiments for June do to the annual evaporation, we shall obtain an annual evaporation amounting to about 22 inches: which is much smaller than the average obtained by Mr. Williams.

Mr. Dalton and Mr. Hoyle have offered us experiments still more correctly conducted. They took place in the vicinity of Manchester during 1796, and the two succeeding years: and according to these experiments the quantity of vapour raised in that quarter annually is about 25 inches; and if to this we add five inches for the dew, it will make the average evaporation for the year 30 inches. Now if we consider the situation of England, and the greater quantity of vapour usually admitted to be raised from water, it will not surely be considered as too great an allowance if we estimate the mean annual evaporation over the whole surface of the globe at 35 inches. But 35 inches from every square inch on the superficies of the earth make 94.450 cubic miles, equal to the water annually evaporated over the whole globe.

This may be a quantity altogether sufficient for the formation and supply of those immense masses of water which constitute the largest of those rivers which we shall presently notice in their order. But by what means is this prodigious expanse of vapour converted into rain, in which form alone it can generate rivers, if it generate them at all?

Rain never begins to fall while the air is transparent: the invisible vapours first pass their maximum, and are changed into vesicular vapours; clouds are formed, and these clouds are gradually dissolved in rain. But clouds are not formed in all parts of the horizon at once; the formation begins at one particular spot, while the rest of the air remains clear as before: the first cloud rapidly increases till it overspreads the whole horizon, and the rain then commences. Now it is remarkable, that though the greatest quantity of vapour exists in the lower strata of the atmosphere, clouds never begin to form there, but always at some considerable height. It is remarkable too, that the part of the atmosphere at which they form has not arrived at the point of extreme moisture, nor near that point, even a moment before their formation. They are not formed then, because a greater quantity of vapour had reached the atmosphere than could remain there without passing its maximum. It is still more remarkable, that when the clouds are formed, the temperature of the spot in which they are formed is not always lowered, though this is sometimes the case. On the contrary, the heat of the clouds themselves is sometimes greater than that of the surrounding air. Neither then is the formation of clouds owing to the capacity of air for combining with moisture being lessened by cold: so far from this, indeed, we often see clouds which had remained in the atmosphere during the heat of the day disappear in the night after the heat of the air has diminished. And hence the formation of clouds and rain, from which rivers are so generally supposed to proceed, are themselves not to be accounted for upon any principles with which we are acquainted.

It is a very remarkable fact, that evaporation often goes on for a month together in hot weather without any rain. This occasionally occurs in our own country; and takes place every year in the torrid zone. Thus at Calcutta, during January 1785, it never rained at all: the mean of the thermometer for the whole month was 66½ degrees: there was no high wind, and indeed during great part of the month little wind at all. And this is also a fact that it is impossible for us to account for. The enquiry therefore is involved in great difficulty. In the beginning of the present century, the philosophical world was agitated by a variety of opinions upon the subject. One party contended strongly for the existence of a large mass of water within the bowels of the earth, which supplied not only the rivers but the ocean itself; at the head of these we may place the ingenious but fanciful Burnet. The French philosophers, on the contrary, asserted, that the waters of the ocean were conveyed back by some subterraneous passages to the land, and being filtrated in their passage, returned again to the sea in the course of the rivers; but this opinion appears contrary to all the known principle of hydrostatics.

It was in opposition to these hypotheses, that our illustrious countryman Halley contended for the process of evaporation, and maintained that the immense deposition of water in consequence of it, is fully adequate to the whole supply. It is highly probable, however, that by some means or other, a kind of circulation is carried on through all nature; and that the sea receives back again, through the channel of the rivers, that water which it parts with to the atmosphere.

All rivers have their source either in mountains, or elevated lakes; and it is in their descent from these, that they acquire that velocity which maintains their future current. At first their course is generally rapid and headlong; but it is retarded in its journey by the continual friction against its banks, by the many obstacles it meets to divert its stream, and by the plane's generally becoming more level as it approaches towards the sea.

Rivers, as every body has seen, are always broadest at the mouth, and narrower towards their source. But what is less known, and probably more deserving curiosity, is, that they run in a more direct channel as they immediately leave their sources; and that their sinuosities and turnings become more numerous as they proceed. It is a certain sign among the savages of North America, that they are near the sea, when they find the rivers winding, and every now and then changing their direction. And this is even now become an indication to the Europeans themselves, in their journeys through those trackless forests. As those sinuosities, therefore, increase as the river approaches the sea, it is not to be wondered at, that they sometimes divide, and thus disembogue by different channels. The Danube disembogues into the Euxine by seven mouths; the Nile, by the same number; and the Wolga, by seventy.

The largest rivers of Europe are, first, the Wolga, which is about six hundred and fifty leagues in length, extending from Reschow to Astrachan. It is remarkable of this river, that it abounds with water during the summer months of May and June; but all the rest of the year is so shallow as scarcely to cover its bottom, or allow a passage for loaded vessels that trade up its stream. The next in order is the Danube. The course of this is about four hundred and fifty leagues, from the mountains of Switzerland to the Black Sea. The Don, or Tanais, which is four hundred leagues from the source of that branch

of it called the Softna, to its mouth in the Euxine Sea. In one part of its course it approaches near the Wolga; and Peter the Great had actually begun a canal, by which he intended joining those two rivers; but this he did not live to finish. The Nieper, or Borysthenes, which rises in the middle of Muscovy, and runs the course of three hundred and fifty leagues, to empty itself into the Black Sea. The Old Cossacks inhabit the banks and islands of this river; and frequently cross the Black Sea, to plunder the maritime places on the coasts of Turkey. The Dwina, which takes its rise in a province of the same name in Russia, that runs a course of three hundred leagues, and disembogues into the White Sea, a little below Archangel.

The largest rivers of Asia are: the Hoanho, in China, which is eight hundred and fifty leagues in length, computed from its source at Raja Ribron, to its mouth in the Gulph of Changi. The Jenisca of Tartary, about eight hundred leagues in length, from the lake Selinga to the Icy Sea. This river is, by some, supposed to supply most of that great quantity of drift-wood which is seen floating in the seas, near the Arctic circle. The Oby, of five hundred leagues, running from the lake of Kila into the Northern Sea. The Amour, in Eastern Tartary, whose course is about five hundred and seventy-five leagues, from its source to its entrance into the sea of Kamtschatka. The Kiam, in China, five hundred and fifty leagues in length. The Ganges, one of the most noted rivers in the world, and about as long as the former. It rises in the mountains which separate India from Tartary; and running through the dominions of the Great Mogul, discharges itself by several mouths into the bay of Bengal. It is not only esteemed by the Indians for the depth and pureness of its stream, but for a supposed sanctity which they believe to be in its waters. It is visited annually by several hundred thousand pilgrims, who pay their devotions to the river as to a god; for savage simplicity is always known to mistake the blessings of the Deity for the Deity himself. They carry their dying friends, from distant countries, to expire on its banks, and to be buried in its stream. The water is lowest in April or May; but the rains beginning to fall soon after, the flat country is overflowed for several miles, till about the end of September; the waters then begin to retire, leaving a prolific sediment behind, that enriches the soil, and, in a few days time, gives a luxuriance to vegetation, beyond what can be conceived by an European. Next to this may be reckoned the still more celebrated river Euphrates. This rises from two sources, northward of the city Erzerum, in Turcomania; and unites about three days journey below the same, whence, after performing a course of five hundred leagues, it falls into the Gulph of Persia, fifty miles below the city of Bassora in Arabia. The river Indus is extended, from its source to its discharge into the Arabian sea, four hundred leagues.

The largest rivers of Africa are: the Senegal, which runs a course of not less than eleven hundred leagues, comprehending the Niger, which some have supposed to fall into it. Later accounts, however, seem to affirm that the Niger is lost in the sands, about three hundred miles up from the western coasts of Africa. Be this as it may, the Senegal is well known to be navigable for more than three hundred leagues up the country; and how much higher it may reach is not yet discovered, as the dreadful fatality of the inland parts of Africa not only deters curiosity, but even avarice, which is a much stronger passion. The celebrated river Nile is said to be nine hundred and seventy leagues, from its source among the mountains of the Moon, in Upper Ethiopia, to its opening into the Mediterranean Sea. Upon its arrival in the kingdom of Upper Egypt, it runs through a rocky channel, which some late travellers have mistaken for its cataracts. In the beginning of its course, it receives many lesser rivers into it; and Pliny was mistaken, in saying that it received none. In the beginning also of its course, it has many windings; but, for above three hundred leagues from the sea, runs in a direct line. Its annual overflowings arise from a very obvious cause, which is almost universal with the great rivers that take their source near the Line. The rainy season, which is periodical in those climates, floods the rivers; and as this always happens in our summer, so the Nile is at that time overflown. From these inundations the inhabitants of Egypt derive happiness and plenty; and, when the river does not arrive at its accustomed height, they prepare for an indifferent harvest. It begins to overflow about the 17th of June; it generally continues to augment for forty days, and decrease in about as many more. The time of increase and decrease, however, is much more inconsiderable now than it was among the ancients. Herodotus informs us, that it was a hundred days rising, and as many falling; which shews that the inundation was much greater at that time than at present. M. Buffon has ascribed the present diminution, as well to the lessening of the mountains of the Moon, by their substance having so long been washed down with the stream, as to the rising of the earth in Egypt, that has for so many ages received this extraneous supply. But we do not find, by the buildings that have remained since the times of the ancients, that the earth is much raised since then. Besides the Nile in Africa, we may reckon Zara, and the Coanza, from the greatness of whose openings into the sea, and the rapidity of whose streams, we form an estimate of the great distance whence they come. Their courses, however, are spent in watering deserts and savage countries, whose poverty or fierceness have kept strangers away.

But of all parts of the world, America, as it exhibits the most lofty mountains, so also it supplies the largest rivers. The principal of these is the great river Amazons, which, from its source in the lake of Lauricocha, to its discharge into the Western ocean, performs a course of more than twelve hundred leagues. The breadth and depth of this river is answerable to its vast length; and, where its width is most contracted, its depth is augmented in proportion. So great is the body of its waters, that other rivers, though before the objects of admiration, are lost in its bosom. It proceeds after their junction, with its usual appearance, without any visible change in its breadth or rapidity; and, if we may so express it, remains great without ostentation. In some places it displays its whole magnificence, dividing into several large branches, and encompassing a multitude of islands; and at length, discharging itself into the ocean, by a channel of an hundred and fifty miles broad. Another river, that may almost rival the former, is the St. Lawrence, in Canada, which rising in the lake Assiniboils, passes from one lake to another, from Christinaux to Alempigo; and thence to lake Superior; thence to the lake Hurons; to lake Erie; to lake Ontario; and, at

last, after a course of nine hundred leagues, pours their collected waters into the Atlantic Ocean. The river Mississippi is more than seven hundred leagues in length, beginning at its source near the lake Assiniboils, and ending at its opening into the Gulph of Mexico. The river Plata runs a length of more than eight hundred leagues from its source in the river Parana, to its mouth. The river Oroonoko is seven hundred and fifty leagues in length, from its source near Pasto, to its discharge into the Atlantic ocean.

Such is the amazing length of the greatest rivers; and even in some of these, the most remote sources very probably yet continue unknown. In fact, if we consider the number of rivers which they receive, and the little acquaintance we have with the regions through which they run, it is not to be wondered at that geographers are divided concerning the sources of most of them. As among a number of roots by which nourishment is conveyed to a stately tree, it is difficult to determine precisely that by which the tree is chiefly supplied; so among the many branches of a great river, it is equally difficult to tell which is the original. Hence it may easily happen, that a similar branch is taken for the capital stream; and its runnings are pursued and delineated, in prejudice of some other branch that better deserved the name and the description. In this manner, in Europe, the Danube is known to receive thirty lesser rivers; the Wolga thirty-two or thirty-three. In Asia, the Hohanno receives thirty-five; the Jenisca above sixty; the Oby as many; the Amour about forty; the Nanquin receives thirty rivers; the Ganges twenty; and the Euphrates about eleven. In Africa, the Senegal receives more than twenty rivers; the Nile receives not one for five hundred leagues upwards, and then only twelve or thirteen. In America, the river Amazons receives above sixty, and those very considerable; the river St. Lawrence about forty, counting those which fall into its lakes; the Mississippi receives forty; and the river Plata above fifty.

The inundations of the Ganges and the Nile have been already mentioned, and it might be added, that almost all great rivers have their periodical inundations from similar causes. The author already quoted observes, that, "besides these annually periodical inundations, there are many rivers that overflow at much shorter intervals. Thus most of those in Peru and Chili have scarce any motion by night; but upon the appearance of the morning sun they assume their former rapidity: this proceeds from the mountain snows, which melting with the heat, increase the stream, and continue to drive on the current while the sun continues to dissolve them."

There are some rivers which are said to lose themselves in chasms under the earth, and to flow for several miles in secret and undiscovered channels. On this circumstance is founded one of the most beautiful fables of antiquity, relative to the fountain of Arethusa, in Sicily. The same thing is affirmed of the Rhine, and even of the river Mole, in Surry, which from this circumstance derives its name. With respect to the two latter rivers, however, some doubts are entertained of the fact.

On this subject there is a memoir of the academy of sciences lately published, by the abbe Guettard. "It is very surprising (he observes) if we reflect on it, that a river in its course, which is very often very extensive, should not meet with spongious soils to swallow up its waters, or gulphs in which they are lost; nevertheless, as there has been hitherto known but a small number of rivers whose waters thus disappear, this phenomenon has been accounted very extraordinary, both by the ancients and moderns." M. Guettard next describes what he has observed in several rivers of Normandy, which are lost and afterwards appear again; these are five in number, viz. the Rille, the Ithon, the Aure, the river of Sap-André, and the Drôme. The three first disappear gradually, and then come in sight again; the fourth loses itself entirely by degrees, but afterwards re-appears; the fifth loses some of its water in its course, and ends by precipitating itself into a cavity, whence it is never seen to rise again.

What seems to occasion the loss of the Rille, the Ithon, and the Aure, is the nature of the soil through which they pass. M. Guettard has observed that it is in general porous, and composed of a thick sand, the grains of which are not well compacted together; it sinks suddenly down by its own weight in some places, and there forms great holes; and when the water overflows the meadows, it frequently makes many cavities in several parts of them. If we therefore suppose inequalities in the channels of these rivers, and that there are certain places in which the water stagnates longer than in others, it must there dilute the ground, if we may use that expression; and having carried away the parts which united the grains of sand together, those grains will become afterwards no other than a kind of sieve, through which the waters will filtrate themselves, provided nevertheless that they find a passage under ground through which they may run. This conjecture appears to be so well founded, that each of these three rivers loses itself nearly in the same manner, that is, through cavities which the people of the country call betoirs, and which swallow up more or less according to their largeness. M. Guettard, who has carefully examined them, remarks, that these betoirs are holes in the form of a tunnel, whose diameter and aperture is at least two feet, and sometimes exceeds eleven; and whose depth varies in like manner from one and two feet, to five, six, and even twenty. The Rille during the summer season loses almost all its water in the space of two short leagues; the Ithon does very near the same. But M. Guettard observes something curious concerning this river, that formerly it was not lost, but kept its course without any interruption, as appears by the history of the country; very likely the mud, which had been collected together in several parts of its channel, might have occasioned the waters remaining in others, and have caused many betoirs. This is the more likely, as the mud having been collected together in the bed of the river Aure, it appears that, in consequence, the cavities were greatly increased, which makes it lose itself much sooner than formerly. Besides, possibly an earthquake happening in the country might have caused several subterraneous canals through which the water of the Ithon has forced its way. In effect, it appears, that a soil's being porous is not sufficient to cause the loss of a river; for if it was, then to do so it would occasion many fens round about, nor would it renew its course after having disappeared a certain time; it must besides find ways under ground through which it may take its course. M. Guettard seems also much inclined to believe, that there are, in these parts, subterraneous cavities through which the waters may

flow; and in consequence of this he reports a number of facts, all tending to prove the truth of it, or at least to prove that there must be hollow quarries serving for strainers to these waters. Upon which occasion he goes into a discussion of this question: Are there any subterraneous rivers, and is the prepossession of some persons in favour of this particular well founded? He makes it appear by several instances which he quotes, and by many reasons which he alleges, that there are at least very great presumptions in favour of this opinion. We are too apt not to look beyond the exterior of things: we feel resistance upon the surface of the earth; when we go deep, we often find it compact. It is therefore hard for us to imagine that it can contain subterraneous cavities sufficient to form channels for hidden rivers, or for any considerable body of water; in a word, that it can contain vast caverns; and yet every thing seems to indicate the contrary. A fact that is observed in the betoirs of the rivers concerning which we have spoken, and particularly of the Rille, proves in some measure that there are considerable lakes of waters in the mountains which limit its course: this fact is, that in winter the greatest part of their betoirs become springs, which supply anew the river's channel with as much water as they had absorbed from it during the summer. Now from whence can that water come, unless from the reservoirs or lakes that are inclosed in the mountains, which being lower than the river in summer, absorb its waters, and being higher in winter by the rain they receive, send it back again in their turn?

M. Guettard strengthens this conjecture by several instances that render it very probable: he remarks at the same time, that this alternate effect of the betoirs swallowing up the water and restoring it again, causes perhaps an invincible obstacle to the restraining of the water within the channel of the river. It has indeed been several times attempted to stop those cavities; but the water returns with such violence in winter, that it generally carries away the materials with which they were stopped.

The river of Sap-André is lost in part, as we have before said, in the same manner as the Ithon and the Rille; but there is something more remarkable in it than in those rivers; to wit, that at the extremity of its course, where there is no perceptible cavity, it is ingulphed, but without any fall; the water passes between the pebbles, and it is impossible to force a stick into that place any further than into the betoirs of which we have spoken. What makes this river take that subterraneous direction, is an impediment which its stream meets with in that place; it is there stopped by a rising ground six or seven feet high, whose bottom it has very likely undermined, to gain a free passage, not having been able to make its way over it. At some distance it appears again; but in winter, as there is a greater quantity of water, it passes over that eminence, and keeps an uninterrupted course.

Lastly, the Drôme, after having lost some of its water in its course, vanishes entirely near the pit of Soucy; in that place it meets with a sort of subterraneous cavity near 25 feet wide, and more than 15 deep, where the river is in a manner stopped, and into which it enters, though without any perceptible motion, and never appears again.

M. Guettard finishes this memoir with some observations upon the Ierre. This river is lost in the same manner as the Rille; and though it is very near Paris, this singularity is unknown to almost every body; was it not for the account of M. l'Abbé le Bœuf, M. Guettard would have been also ignorant of it. And as he thinks the chief object of a naturalist's observation ought to be the public good, he examines the means which might be employed to restrain the water of the Ierre. The same object has made him add a description of the manner how the Rhone is lost, or rather how its course is disturbed; for it is now very certain that it does not lose itself, but that its channel is extremely confined, in the place where it was pretended that it lost itself, by two mountains, between whose feet it runs. M. Guettard makes it appear that it might not be impossible to widen that place, and give a sufficient channel to the river; which would render it navigable, and be of vast utility to all the country.

The many advantages which accrue to a country from an abundance of rivers, especially large navigable ones, are too obvious to require any particular detail: but the disadvantages and calamities occasioned by them are frequently no less obvious and fatal. Whole tracts of country are sometimes overflowed on a sudden, and every thing swept away at once; or if the deluge proceeds not such a length, yet by the quantity of stagnating water which is left, marshes are produced, which bring on diseases in the neighbouring parts. It becomes therefore an object well worthy the public attention, how to secure the banks of rivers, or to form their channels in such a manner that the superfluous water may be carried off into the ocean without producing the mischievous effects abovementioned. In a treatise on rivers and canals published in the Phil. Trans. vol. 69. by Mr. Mann, he treats this subject at great length. Having laid down a number of theorems concerning the descent of the water in rivers, he points out a method of determining whether the motion of a river in any particular place is derived from the inclination of the bottom of its channel, or merely from the pressure of the upper parts of the water upon the lower. "For this purpose," says he, "a pole must be thrust down to the bottom, and held perpendicularly to the current of the water, with its upper end above the surface; if the water swells and rises immediately against the pole, it shows that its flowing is by virtue of a preceding declivity; if, on the contrary, the water stops for some moments before it begins to rise against the pole, it is a proof that it flows by means of the compression of the upper waters upon the lower."

The best and most simple method of measuring the velocity of the current of a river, according to our author, is as follows: "Take a cylindrical piece of dry light wood, and of a length something less than the depth of the water in the river; round one end of it let there be suspended as many small weights as may be necessary to keep up the cylinder in a perpendicular situation in the water, and in such a manner that the other end of it may just appear above the surface of the water. Fix to the centre of that end which appears above water a small and straight rod precisely in the direction of the cylinder's axis; to the end that, when the instrument is suspended in the water, the deviations of the rod from a perpendicularity to the surface of it may indicate which end of the cylinder advances the fastest, whereby may be discovered the different velocities of the water at different depths; for if the rod inclines forwards according to the direction of the

current, it is a proof that the surface of the water has the greatest velocity; but if it inclines back, it shows that the swiftest current is at the bottom; if it remains perpendicular, it is a sign that the velocities at the surface and bottom are equal.

"This instrument being placed in the current of a river or canal receives all the percussions of the water throughout the whole depth, and will have an equal velocity with that of the whole current from the surface to the bottom at the place where it is put in; and by that means may be found, both with ease and exactness, the mean velocity of that part of the river for any determinate distance and time.

"But to obtain the mean velocity of the whole section of the river, the instrument must be put successively both in the middle and towards the sides, because the velocities at those places are often very different from each other. Having by this means found the difference of time required for the currents to run over an equal space, or the different distances run over in equal times; the mean proportional of all these trials, which is found by dividing the common sum of them all by the number of trials, will be the mean velocity of the river or canal.

"If it is required to find the velocity of the current only at the surface, or at the middle, or at the bottom, a sphere of wood, of such a weight as will remain suspended in equilibrium with the water at the surface or depth which we want to measure, will be better for the purpose than a cylinder, because it is only affected by the water of that part of the current where it remains suspended.

"It is a very easy guide both to the cylinder and the globe in that part which we want to measure, by means of two threads, or small cords, which two persons must hold and direct, one on each side of the river; taking care at the same time neither to retard nor accelerate the motion of the instrument."

Our author next proceeds to deduce from his theory the best methods of removing the defects and inconveniencies which must necessarily happen to rivers and canals in a series of years. From his theory he draws the following conclusion: that the deeper the waters are in their bed in proportion to its breadth, the more their motion is accelerated; so that their velocity increases in an inverse ratio of the breadth of a bed, and also of the greatness of the section; whence are deduced the two following universal practical rules; 1st. To augment the velocity of water in a river or canal, without augmenting the declivity of the bed, we must increase the depth and diminish the breadth of its bed. 2dly. But to diminish the velocity of water in a river or canal, we must, on the contrary, increase the breadth and diminish the depth of its bed.

The above proposition is perfectly conformable to observation and experience: for it is constantly seen, that the current is the swiftest where the waters are deepest and the breadth of the bed the least, and that they flow slowest where their depth is the least and the breadth of the bed the greatest. "The velocity of the waters," says M. de Buffon, "augments in the same proportion as the section of the channel through which they pass diminishes, the force of impulsion from the back waters being supposed always the same. Nothing," continues he, "produces so great a diminution in the swiftness of a current as its growing shallow; and on the contrary, the increase of the volume of water augments its velocity more than any other cause whatever." The celebrated Wolfe in his hydraulics assures us, that "it is a constant and universal practice, for accelerating the current of waters, to deepen the bed, and at the same time to render it narrower."

When the velocity which a river has acquired by the elevation of its springs and the impulse of the back water, is at last totally destroyed by the different causes of resistance becoming exactly equal to, or greater than, the first, the bed and current at the same time being horizontal, nothing else remains to propagate the motion, except the sole perpendicular compression of the upper waters upon the lower, which is always in a direct ratio of their depth. But this necessary resource, this remaining cause of motion in rivers, augments in proportion as all the others diminish, and as the want of it increases; for as the waters of rivers in extensive plains lose the acceleration of motion acquired in their descent from their springs, their quantity accumulates in the same bed by the junction of several streams together, and their depth increases in consequence. This junction and successive accumulation of many streams in the same bed, which we see universally in a greater or lesser degree in all rivers throughout the known world, and which is so absolutely necessary to the motion of their waters, can only be attributed, says Signor Guglielmini, to the infinite wisdom of the supreme Author of Nature.

The velocities of flowing waters is very far from being in proportion to the quantity of declivity in their bed. If it was a river whose declivity is uniform and double to that of another, it ought only to run with double the swiftness when compared to it; but in effect it is found to have a much greater, and its rapidity, instead of being only double, will be triple, quadruple, and sometimes even more; for its velocity depends much more on the quantity and depth of the water, and on the compression of the upper waters on the lower, than on the declivity of the bed. Consequently, whenever the bed of a river or canal is to be dug, the declivity must not be distributed equally throughout the whole length; but, to give a swifter current to the water, the declivity must be much greater in the beginning of its course than towards the end where it disembogues itself, and where the declivity must be almost insensible, as we see is the case in all natural rivers; for when they approach near the sea, their declivity is little or nothing; yet they flow with a rapidity which is so much greater, as they contain a greater volume of water; so that in great rivers, although a large extent of their bed next the sea should be absolutely horizontal, and without any declivity at all, yet their waters do not cease to flow, and to flow even with great rapidity, both from the impulsion of the back-waters, and from the compression of the upper waters upon the lower in the same section.

Whoever is well acquainted with the principles of the higher geometry, will easily perceive that it would be no difficult matter so to dig the bed of a canal or river, that the velocity of the current should be every where equal. It would be only giving it in the form of a curve along which a moving body should recede from a given point, and describe spaces every where proportional to the times, allowance being made for the quantity of effect of the compression of the upper waters upon the lower. This curve is what is called the

horizontal isochronic, being the flattest of an infinity of others which would equally answer the problem where fluids were not concerned.

All obstacles whatever in the bed of a river or canal, such as rocks, trunks of trees, banks of sand and mud, &c. must necessarily hinder proportionably the free running off of the water; for it is evident, that the waters so far back from these obstacles, until the horizontal level of the bottom of the bed becomes higher than the top of the obstacles, must be entirely kept up and hindered from running off in proportion. Now as the waters must continue to come down from their sources, if their free running off is hindered by any obstacles whatever, their relative height back from them must necessarily be increased until their elevation, combined with the velocity of their current proceeding from it, is arrived to such a pitch at the point where the obstacles exist, as to counterbalance the quantity of opposition or impediment proceeding thence, which frequently does not happen until all the lower parts of the country round about are laid under water.

Now it is certain from all experience, that the beds of rivers and canals in general are subject to some or others of the obstacles above-mentioned. If rocks or trees do not bar their channels, at least the quantity of sand, earth, and mud, which their streams never fail to bring down, particularly in floods, and which are unequally deposited according to the various windings and degrees of swiftness in the current, must unavoidably, in course of time, fill up, in part, different places in the channel, and hinder the free running off of the back-waters. This is certainly the case, more or less, in all rivers, and in all canals of long standing, as is notorious to all those well acquainted with them. Hence, if these accidents are not carefully and with a constant attention prevented, inundations occur which sometimes lay waste whole districts, and ruin the finest tracts of ground, by covering them with sand; hence rivers become unnavigable, and canals useless for the purposes for which they were constructed. Canals, in particular, as their waters for the most part remain stagnant in them, are still more liable than rivers to have their beds fill up by the subsiding of mud, and that especially for some distance above their sluices; insomuch, that if continual care is not taken to prevent it, or remedy it as often as it happens, they will soon become incapable of receiving and passing the same vessels as formerly. Nay, the very sluices themselves, if the floors of their bottoms are not of a depth conformable to the bed of the canal, will produce the same accidents as those we have been speaking of; for if they are placed too low, they will be continually filling up with sand or mud; if too high, they have the same effect as banks or bars in the bed of a river, that is, they hinder all the back-waters under their level from running off, and soon fill up the bed to that height by the subsiding of mud. This effect is much accelerated by the shutting of the lower sluices, which makes a great volume of water flow back to those next above them, till the whole is filled and become stagnant. Now it is evident, that this state of things must contribute far more to the subsidency of mud, and all other matters brought down by the waters in canals, than can be the case in rivers whose currents constantly flow.

The waters of all rivers and canals are from time to time muddy; their streams, particularly during rains and floods, carry along with them earth and other substances which subside in those places where their currents are the least, by which their beds are continually raised; so that the successive increase of inundations in rivers, and of unfitness for navigation in canals, when they are neglected and left to themselves, is a natural and necessary consequence of the state of things, which no intelligent person can be at a loss to account for; and yet whole countries remain in this habitual state of negligence, to their very great detriment.

Having thus shown the principal accidents which rivers and canals are liable to, with the causes of them, our author proceeds to point out the most efficacious methods of preventing them, or at least of diminishing their effects. They flow immediately from the principles laid down in his essay, and do not need many words to make them completely understood. A work of this kind, he observes, if it is properly conducted, must be begun at the lower end of the river or canal: that is, at that end where their waters are discharged into the sea, or where they fall into some other greater river or canal, whence their waters are carried off without further hindrance. If it is a river whose bed, by being filled up with sand, mud, or other obstacles, and by being otherwise become irregular in its course, is often subject to its inundations, and incapable of internal navigation, the point, from which the work must be begun and directed throughout all the rest of the channel, is from the lowest water-mark of spring-tides on the shore at the mouth of the river, or even something below it, if it can be done; though this part will soon fill up again by the sand, mud, &c. which the tides cease not to roll in.

If it be a canal whose bed is to be dug anew, or one already made, which is to be cleaned and deepened from the sea-shore or some large river back into the country, and where no declivity is to be lost, as is the case in all flat countries; the work must be begun, and the depth of the whole channel directed, from the lower water-mark of spring-tides, if the mouth is to the sea, or from such a depth in the channel of the river, if the canal falls into one, that there may be such a communication of water from the canal to the river, in all situations of the current, as may let boats freely pass from one to the other. This, of course, must also direct the depth of the floor of the last sluice towards the mouth of the canal, be it to the sea or into a river. If the bottom or floor of a sluice already constructed is too low, it will soon fill up with sand or mud, and hinder the gates from opening, unless it is continually cleaned out: if, on the contrary, this floor is too high, and in a canal whose natural declivity is too little for the free current of the water, as is generally the case in Holland and Flanders, all depth of the bed of the canal below the horizontal level of the bottom of the sluice will serve to no manner of purpose, either for navigation, or for carrying off the back-waters, but will soon fill up with mud, in spite of all means used to the contrary, except that of digging it continually anew to no manner of purpose.

Setting off from this determinate point, at the mouth of a river, or at the bottom of the last sluice upon a canal, which are to be cleaned and deepened; the work must be carried on, in consequence, uniformly throughout their whole course backwards into the country as far as is found necessary for the purposes intended. This is to be done after the following manner:

1st. One must dig up and carry away all irregularities in the bottom and sides of the bed, such as banks of sand and mud, rocks, stumps or trunks of trees, and whatever else may cause an obstacle to the regular motion of the water, and to the free passage of vessels upon it.

2dly. If the declivity of the bed should be still too little to give a sufficient current to carry off the water as often and as fast as is necessary, the whole bed itself must be regularly deepened, and what is dug out from the bottom must be laid upon the sides, to render it narrower in proportion to its depth.

3dly. Wherever the banks are too low to contain the stream in all its situations, they must be sufficiently raised; which may be conveniently done with what is dug out from the bed; and the whole being covered with green turf will render these banks firm and solid against the corrosion of the water. It is proper at all times to lay upon the banks what is dug from the bed, by which they are continually strengthened against the force of the current.

4thly. It is often necessary to diminish the windings and sinuosities in the channel as much as possible, by making new cuts, whereby its course may approach towards a right line. This is a great resource in flat countries subject to inundations; because thereby all the declivity of a great extent of the river, through its turns and windings, may be thrown into a small space by cutting a new channel in a straight line; as may generally be done without obstacle in such countries as we are speaking of, and hereby the velocity of the current will be very greatly augmented, and the back-waters carried off to a surprising degree.

5thly. Wherever there is a confluence of rivers or canals, the angle of their junction must be made as acute as possible, or else the worst of consequences will arise from the corrosion of their respective streams; what they carry off from the sides will be thrown into irregular banks in the bottom of the bed. This acute angle of the junction may always be procured by taking the direction at some distance from the point of confluence.

6thly. Wherever the sides or banks of a river are liable to a more particular corrosion, either from the confluence of streams, or from irremediable windings and turns in the channel, they must be secured against it as much as possible by weirs: for this corrosion not only destroys the banks, and alters by degrees the course of the river, but also fills up the bed, and produces all the bad effects we have spoken of above.

7thly. But the principal and greatest attention in digging the beds of rivers and canals must be had to the quantity and form of their declivity. This must be done uniformly throughout their whole extent, or so much of it as is necessary for the purposes in hand, according to the principles laid down. Conformable thereto, the depths of their beds, and of the floors of their sluices, at the mouths where they discharge their waters, being fixed, the depth of the rest of the beds, and the quantity of declivity, must be regulated in consequence thereof, so as to increase regularly the quantity of the declivity in equal spaces the further we recede from their mouths, and proceed towards their sources or to the part where the regular current is to take place.

If the depth and volume of water in a river or canal is considerable, it will suffice, in the part next the mouth, to allow one foot perpendicular of declivity through six, eight, or even, according to Deschales, ten thousand feet in horizontal extent; at most it must not be above one in six or seven thousand. Hence the quantity of declivity in equal spaces must slowly and gradually increase as far as the current is to be made fit for navigation; but in such a manner, as that at this upper end there may not be above one foot of perpendicular declivity in four thousand feet of horizontal extent. If it is made greater than that, in a regular bed containing a considerable volume of water, the current will be so strong as to be found very unfit for the purposes of navigation.

Mr. Mann calls the centre of the current, or more properly, line of greatest current, that line which passes through all the sections of a river, in the point where the velocity of the current is the greatest of all. If the current of a river is regular, and in a right line, its centre or line of greatest velocity will be precisely in the centre of the sections; but on the contrary, if the bed is irregular and full of turns and windings, the centre, or line of greatest current, will likewise be irregular, and often change its distance and direction with regard to the centres of the sections through which the waters flow, approaching successively, and more or less, to all parts of the bed, but always in proportion and conformably to the irregularities in the bed itself.

This deviation of the line of greatest current from the centres of the sections through which it passes, is a cause of many and great changes in the beds of rivers, such as the following:

1st. In a straight and regular bed, the greatest corrosion of the current will be in the middle of the bottom of the bed; because it is that part which is nearest to the line of greatest current, and at the same time which is most acted upon by the perpendicular compression of the water. In this case, whatever matters are carried off from the bottom will be thrown, by the force of the current, equally toward the two sides, where the velocity of the stream is the least in the whole section.

2dly. If the bed is irregular and winding, the line of greatest current will be thrown towards one side of the river, where its greatest force will be exerted in proportion to the local causes which turn it aside: in short turns of a river there will be a gyration, or turning round of the stream, from its beating against the outer side of the angle; this part will be corroded away, and the bottom near it excavated to a great depth. The matters so carried off will be thrown against the opposite bank of the river, where the current is the least, and produce a new ground called an alluvion.

3dly. Inequalities at the bottom of a river retain and diminish the velocity of the water, and sometimes may be so great as to make them reflow; all these effects contribute to the subsiding of sand, earth, and other matters, which cease not to augment the volume of the obstacles themselves, and produce shallows and banks in the channel. These in time, and by a continuance of the causes, may become islands, and so produce great and permanent changes and irregularities in the beds of rivers.

4thly. The percussions of the centre of the current against the sides of the bed are so much the greater as they are made under a greater angle of incidence; whence it follows, that the force of percussion, and the quantity of corrosion and detriment done to the banks and weirs of rivers, and to the walls of buildings which are

exposed to that percussion, are always in a direct compound proportion of the angle of incidence, of the greatness and depth of the section together, and of the quantity of velocity of the current.

5thly. It may happen in time, that the excavation of the bottom, and the corrosion of the sides, will have so changed the form of the bed as to bring the force of percussion into equilibrium with the velocity and direction of the current; in that case, all further corrosion and excavation of the bed ceases.

6thly. This gives the reason why when one river falls into another almost in a perpendicular direction, and makes with it too great an angle of incidence, this direction is changed in time, by corrosions and alluvions, into an angle much more acute, till the whole comes into equilibrium.

7thly. So great and such continued irregularities, from local causes, may happen in the motion of a river as will entirely change its ancient bed, corrode through the banks where they are exposed to the greatest violence of percussion of the stream, and open new beds in grounds lower than the old one is become.

8thly. Hereupon the state of the old bed will entirely depend on the quantity of water, and on the velocity and direction of the current in the new one; for immediately after this division of the waters into two beds is made, the velocity of the current in the old one will be diminished in proportion to its less depth. In consequence, the waters will precipitate more of their mud, &c. in equal spaces than they did before; which will more and more raise up the bottom, sometimes even till it becomes equal with the surface of the stream. In this case, all the water of the river will pass into the new bed, and the old one will remain entirely dry. It is well known that this has happened to the Rhine near Leyden, and to many other rivers.

9thly. Hence the cause of the formation of the new branches and mouth, by which great rivers discharge their waters into the sea.

With respect to the mathematical theory of the motion of water in rivers, although it is highly curious, we cannot enter largely into it here; but shall merely add the following propositions and remarks, from professor Playfair's Outlines of Natural Philosophy.

1. Water running in open canals, or in rivers, is accelerated in consequence of its depth, and of the declivity on which it runs, till the resistance, increasing with the velocity, become equal to the acceleration, when the motion of the stream becomes uniform.

It is evident, that the amount of the resisting forces can hardly be determined by principles already known, and therefore nothing remains, but to ascertain by experiment, the velocity corresponding to different declivities, and different depths of water, and to try, by multiplying and extending these experiments, to find out the law which is common to them all.

The Chevalier du Buat has been successful in this research, and has given a formula for computing the velocity of running water, whether in close pipes, open canals, or rivers, which, though it may be called *empirical*, is extremely useful in practice. Principes d'Hydraulique, par M. Le Chevalier du Buat, 2 vol. 8vo, edit. 2. Paris, 1786. Professor Robison has given an abridged account of this book, in his excellent articles on rivers and water-works, in the Encyclopædia Britannica.

Let V be the velocity of the stream, measured by the inches it moves over in a second; R a constant quantity, viz. the quotient obtained by dividing the area of the transverse section of the stream, expressed in square inches, by the boundary or perimeter of that section, *minus* the superficial breadth of the stream, expressed in linear inches.

The mean velocity is that with which, if all the particles were to move, the discharge would be the same with the actual discharge.

The line R is called by Du Buat the radius, and by Dr. Robison the hydraulic mean depth. As its affinity to the radius of a circle seems greater than to the depth of a river, we shall call it, with the former, the radius of the section.

Lastly, let S be the denominator of a fraction which expresses the slope, the numerator being unity, that is, let it be the quotient obtained by dividing the length of the stream, supposing it extended in a straight line, by the difference of level of its two extremities; or, which is nearly the same, let it be the co-tangent of the inclination or slope.

2. The above denominations being understood, and the section, as well as the velocity, being supposed uniform, $V =$

$$\frac{307\sqrt{R-\frac{1}{10}}}{S^{\frac{1}{2}}-\frac{1}{2}\log.\left(S+\frac{16}{10}\right)}-\frac{3}{10}\sqrt{R-\frac{1}{10}};$$

$$\text{or } V=\sqrt{R-\frac{1}{10}}\left(\frac{307}{S^{\frac{1}{2}}-\frac{1}{2}\log.\left(S+\frac{16}{10}\right)}-\frac{3}{10}\right).$$

See Du Buat, *ubi supra*, § 51., &c. At § 52. p. 65. the formula is reduced to English measure, as now given.

When R and S are very great, $V =$

$$R^{\frac{1}{2}}\left(\frac{307}{S^{\frac{1}{2}}-\frac{1}{2}\log S}-\frac{3}{10}\right) \text{ nearly.}$$

The logarithms understood here are the hyperbolic.

The slope remaining the same, the velocities are as $\sqrt{R-\frac{1}{10}}$.

The velocities of two great rivers that have the same declivity, are as the square roots of the radii of their sections.

If R is so small, that $\sqrt{R-\frac{1}{10}}=0$, or $R=\frac{1}{10}$, the velocity will be nothing; which is agreeable to experience; for in a cylindric tube $R=\frac{1}{2}$ the radius: the radius, therefore, equal two-tenths; so that the tube is nearly capillary, and the fluid will not flow through it.

The velocity may also become nothing, by the declivity becoming so small, that

$$\frac{307}{S^{\frac{1}{2}}-\frac{1}{2}\,\text{Log}\left(S+\frac{16}{10}\right)}-\frac{3}{10}=0; \text{ but}$$

$\frac{1}{S}$ if is less than $\frac{1}{500000}$, or than $\frac{1}{10}$th of an inch to an English mile, the water will have sensible motion.

3. In a river, the greatest velocity is at the surface, and in the middle of the stream, from

which it diminishes toward the bottom and the sides, where it is least. It has been found by experiment, that if from the square root of the velocity in the middle of the stream, expressed in inches *per* second, unity be subtracted, the square of the remainder is the velocity at the bottom.

Principes d'Hydraulique, par Du Buat, § 67.

Hence, if the former velocity be $= v$, the velocity at the bottom $= v - 2\sqrt{v} + 1$.

4. The mean velocity, or that with which, were the whole stream to move, the discharge would be the same with the real discharge, is equal to half the sum of the greatest and least velocities, as computed in the last proposition.

The mean velocity is, therefore, $= v - \sqrt{v} + \frac{1}{2}$.

This is also proved by the experiments of Du Buat.

5. Suppose that a river having a rectangular bed, is increased by the junction of another river equal to itself, the declivity remaining the same; required the increase of depth and velocity.

Let the breadth of the river $= b$, the depth, before the junction, d, and after it, x; and, in like manner, v and v' the mean velocities before and after; then $\frac{b\,d}{b + 2\,d}$ is the radius before, and $\frac{b\,x}{b + 2\,x}$ the radius after, so $v = \frac{307\,R^{\frac{1}{2}}}{S^{\frac{1}{2}}}$, supposing the breadth of the river to be such, that we may reject the small quantity subtracted from R, in § 287.; and, in like manner, $v' = \frac{307\,R'^{\frac{1}{2}}}{S^{\frac{1}{2}}}$.

Then, substituting for R and R', we have

$$v = \frac{307}{S^{\frac{1}{2}}} \times \sqrt{\frac{b\,d}{b + 2\,d}}, \text{ and}$$

$$v' = \frac{307}{S^{\frac{1}{2}}} \times \sqrt{\frac{b\,x}{b + 2\,x}}.$$ Multiplying these into the areas of the sections $b\,d$ and $b\,x$, we have the discharges, viz. $b\,d\,v = \frac{307}{S^{\frac{1}{2}}} \times \frac{b\,d\sqrt{b\,d}}{\sqrt{b + 2\,d}}$ and $b\,x\,v' = \frac{307}{S^{\frac{1}{2}}} \times \frac{b\,x\sqrt{b\,x}}{\sqrt{b + 2\,x}}$. Now the last of these is double of the former; therefore

$$\frac{b\,x\sqrt{b\,x}}{\sqrt{b + 2\,x}} = \frac{2\,b\,d\sqrt{b\,d}}{\sqrt{b + 2\,d}}, \text{ or } \frac{x^3}{b + 2\,x} = \frac{4\,d^3}{b + 2\,d}, \text{ and } x^3 - \frac{3\,d^3}{b + 2\,d}\,x = \frac{4\,b\,d^3}{b + 2\,d},$$

a cubic equation which can always be resolved by Cardan's rule.

As an example, let $b = 10$ feet, and $d = 1$, then $x^3 - \frac{2}{3}x = \frac{10}{3}$, and $x = 1.4882$, which is the depth of the increased river. Hence we have $1.488 \times v' = 2\,v$, and $1.488 : 2 :: v : v'$, or $v : v' :: 37$ to 50 nearly.

When the water in a river receives a permanent increase, the depth and the velocity, as in the example above, are the first things that are augmented. The increase of the velocity increases the action on the sides and bottom, in consequence of which the width is augmented, and sometimes also, but more rarely, the depth. The velocity is thus diminished, till the tenacity of the soil, or the hardness of the rock, afford a sufficient resistance to the force of the water. The bed of the river then changes only by insensible degrees, and, in the ordinary language of Hydraulics, is said to be permanent, though in strictness this epithet is not applicable to the course of any river.

RIVER GOD. Tutelary deity of a river.

RIVER HORSE. In mastiology. See HIPPOPOTAMUS.

RI'VET. *s.* (*river*, Fr. to drive.) A fastening pin clenched at both ends (*Dryden*).

To RI'VET. *v. a.* (from the noun.) 1. To fasten with rivets (*Ben Jonson*). 2. To fasten strongly; to make immoveable (*Congreve*). 3. To drive or clench a rivet (*Moxon*).

RIVINA, in botany, a genus of the class tetrandria, order monogynia. Corol four-petalled, permanent; calyxless; berry one-seeded; seed lentiform. Four species; natives of America or the West Indies. Three, as follow, are cultivated.

1. R. humilis. Downy rivina.
2. R. lævis. Smooth rivina.
3. R. octandra. Climbing rivina.

The flowers and berries of rivina lævis are scarlet; and the juice extracted from the latter is sometimes used to stain paper and linen of a bright red; and various experiments have proved that it will also colour the white petals of fresh flowers with a similar hue, their stalks being plunged into phials filled with the juice: it has succeeded best with the tuberose and double white narcissus.

RIVINUS (Andrew), of Halle, in Saxony, was a physician, and professor of poetry and philosophy at Leipsic, and died 1656, aged 56. His works are, remarks on ancient christian poets—dissertation on literary subjects, 4to.—veterum scriptorum de medicinâ collectanea, 8vo.—mysteria medico-physica, 12mo. &c.

RIVINUS (Augustus Quirinus), professor of medicine at Leipsic, died there 1722, aged 70. He wrote introductio in rem herbariam, folio, with plates—ordo plantarum quæ sunt flore irregulari monopetalo, tetrapetalo, pentapetalo, folio, with figures—censura medicamentorum officinal. 4to.—dissertationes medicæ, 4to. &c.

RIVOLO, a town of Italy, in the Veronese, on the lake Garda, 16 miles N.W. of Verona.

RI'VULET. *s.* (*rivulus*, Latin.) A small river; a brook; a streamlet (*Bentley*).

RIXDO'LLAR. *s.* A German coin, worth about four shillings and sixpence sterling.

RIZZIO (David), or RIZZI, an Italian musician, born at Turin. He came in the retinue of the Piedmontese ambassador to Scotland, and as he was a good singer, Mary placed him near her person, and made him her secretary for foreign languages. His influence, as well as his religion, proved offensive to the nobles, especially Darnley, her husband, who headed a conspiracy against him, and dispatched him with 56 wounds in the queen's presence, 1566. It is said that Rizzio refined the Scotch airs, and infused into them that sweetness so much admired.

ROACH, in ichthyology, a species of CYPRINUS, which see.

The fishes of this species are more to be esteemed which are found in rivers than those found in ponds, though the latter are much larger. It is a fish of no great reputation for his dainty taste, and his spawn is accounted much better than any other part of him: as the carp is accounted the water-fox for his cunning, so the roach is accounted the water-sheep, for his simplicity or foolishness. The roach and dace recover strength, and grow in season a fortnight after spawning; the barbel and chub in a month, the trout in four months, and the salmon in the like time, if he get into the sea, and afterwards into fresh water.

The season for fishing for roach, in the Thames, begins about the latter end of August, and continues much longer than it is either pleasant or safe to fish. It requires some skill to hit the time of taking them exactly; for all the summer long they live on the weed, which they do not forsake for the deeps till it becomes putrid; and that is sooner or later, according as the season is wet or dry: whence the fishermen who live in all the towns along the river, from Chiswick to Stains, are about the time of the rotting of the weeds nightly upon the watch, as soon as the roach come out to sweep them away with a drag-net; while the poor patient angler is perhaps left baiting the ground, and adjusting his tackle, to catch those very fish which, perhaps, the night before had been carried to Billingsgate.

There is a kind of bastard small roach, that breeds in ponds, with a very forked tail, and of a very small size; which some say is a mule, bred by the bream and right roach. Some ponds are stored with these beyond belief; and the curious, who know their difference, call them ruds. They differ from the true roach, as much as a herring from a pilchard; and this bastard breed of roach is now scattered in many rivers, but not in the Thames, which affords the largest and fattest in this nation.

The roach is a leather-mouthed fish, and has a kind of saw-like teeth in his throat.

In April, the caddy, or worms, are proper baits for him; in summer, angle for him with small white snails, or flies; but they must be under water, for he will not bite at the top: or you may take a May fly, and with a plumb sink it where you imagine roaches lie, whether in deep water, or near the posts and piles of a bridge or wear. Having so done, do not hastily, but gently pull up your fly; and if there be a roach there, you will see him pursue and take it near the surface of the water.

In autumn you may angle for him with paste only, made of crumbs of fine white bread, moulded with a little water in your hands, till it becomes tough paste; and colour it, but not very deep, with red lead; with which you may mix a little fine cotton, or lint, and a little butter. These last are to connect the paste, so that it do not wash off your hook; with which you must fish with much circumspection, lest you lose your bait. In winter you may also fish for roach with paste; yet gentles are then a better bait.

There is excellent bait experienced to be very good, either for winter or summer, viz. Take a handful of well-dried malt, and put it into a dish of water; and having grubbed it and washed it between your hands till it be clean and free from husks, pour that water from it, and put in a little fresh water; set it over a gentle fire, and let it boil till pretty soft; then pour the water from it, and with a sharp knife turning the sprout end of the corn upward, take off the back part of the husk with the point of your knife, leaving a kind of inward husk on the corn, otherwise you spoil all: then cut off a little of the sprout end, that the white may appear, and also a very little of the other end, for the hook to enter.

When you make use of this bait, occasionally cast a little of it into the water; and if your hook be small and good, you will find it an excellent bait either for roach or dace.

The way of fishing for roach at London Bridge, is as follows. In the months of June and July, a great multitude of roach resort there, where those that make a trade of it take a strong cord, at the end of which is fastened a three pound weight, and a foot above the lead is fixed a packthread of twelve feet long to the cord; and to the packthread, at convenient distances, a dozen strong links of hair, with roach-hooks at the end, baited with a white snail, or perriwinkle. While the fishermen hold the cord in their hands, the biting of the fish draws the packthread, and the packthread the cord, which is a signal to pull up; on doing which they sometimes pull up half a dozen, but seldom less than two or three at a draught.

ROAD, an open way, or public passage, forming a communication between one place and another. Of all the people in the world the Romans took the most pains in forming roads; and the labour and expenses they were at in rendering them spacious, firm, straight, and smooth, are incredible. They usually strengthened the ground by ramming it, laying it with flints, pebbles, or sands, and sometimes with a lining of masonry, rubbish, bricks, &c. bound together with mortar. In some places in the Lionois, F. Menestrier observes that he has found huge clusters of flints cemented with lime, reaching 10 or 12 feet deep, and making a mass as hard and compact as marble; and which, after resisting the injuries of time for 1600 years, is still scarce penetrable by all the force of hammers, mattocks, &c. and yet the flints it consists of are not bigger than eggs. The most noble of the Roman roads was the Via Appia, which was carried to such a vast length, that Procopius reckons it five days journey to the end of it, and Leipsius computes it at 350 miles: it is 12 feet broad, and made of square free stone, generally a foot and a half on each side; and though this has lasted for above 1800 years, yet in many places it is for several miles together as entire as when it was first made.

The ancient roads are distinguished into military roads, double roads, subterraneous roads, &c. The military roads were grand roads, formed by the Romans for marching their armies into the provinces of the empire; the principal of these Roman roads in England are Watling-street, Ikenild-street, Foss-way, and Erminage-street. Double roads among the

Romans were roads for carriages, with two pavements, the one for those going one way, and the other for those returning the other: these were separated from each other by a causeway raised in the middle, paved with bricks, for the conveniency of foot passengers; with borders and mounting stones from space to space, and military columns to mark the distance. Subterraneous roads are those dug through a rock, and left vaulted; as that of Puzzuoli near Naples, which is near half a league long, and is 15 feet broad, and as many high.

The first law enacted respecting highways and roads in England was in the year 1285; when the lords of the soil were enjoined to enlarge those ways where bushes, woods, or ditches be, in order to prevent robberies. The next law was made by Edward III. in the year 1346, when a commission was granted by the king to lay a toll on all sorts of carriages passing from the hospital of St. Giles in the fields to the bar of the old Temple, and also through another highway called Portpool (now Gray's Inn Lane) joined to the before-mentioned highway; which roads were become almost impassable.

ROAD (Rail). See RAILROAD.

ROAD, in navigation, a bay, or place of anchorage, at some distance from the shore, whither ships or vessels occasionally repair to receive intelligence, orders, or necessary supplies; or to wait for a fair wind, &c. The excellence of a road consists chiefly in its being protected from the reigning winds and the swell of the sea; in having a good anchoring ground, and being at a competent distance from the shore. Those which are not sufficiently inclosed are termed *open roads*.

ROAD, signifies also, 1. Inroad; incursion (*Knolles*). 2. Journey (*Milton*). 3. The act, or state of travelling (*Law*).

To ROAM. *v. n.* (*romigare*, Italian.) To wander without any certain purpose; to ramble; to rove; to play the vagrant (*Prior*).

To ROAM. *v. a.* To range; to wander over (*Milton*).

ROA'MER. *s.* (from *roam.*) A rover; a rambler; a wanderer; a vagrant.

ROAN. A designation of colour applied to a horse when his coat seems to be formed of a combination of sorrel and white hairs in nearly an equal proportion. Horses of this description are, in general, of no great attraction, although they may prove equal in execution with others of every colour: the general opinion, however, is, that they are weaker in constitution, less likely to work, and more subject to disease.

ROAN TREE. See CORBUS.

ROANNE, a town of France, in the department of Loire, seated on the Loire, where it begins to be navigable for barks. Hence the merchandise of Lyon is conveyed to Paris, Orleans, Nantes, &c. Roanne is 45 miles W.N.W. of Lyon, and 210 S.S.E. of Paris. Lon. 3. 58 E. Lat. 46. 4 N.

ROANOKE, an island of N. Carolina, on the S. side of Albemarle sound. It is famous for being the place where sir Walter Raleigh made the first British settlement in N. America.

ROANOKE, a river of the United States, formed by the junction of the Staunton and Dan, in the S. part of Virginia. It is subject to inundations, and, on account of the falls, is navigable for shallops only, about 60 or 70 miles. It enters, by several mouths, into the S.W. part of Albemarle sound.

To ROAR. *v. n.* (ռαραn, Saxon.) 1. To cry as a lion or other wild beast (*Shakspeare*). 2. To cry in distress (*Dryden*). 3. To sound as the wind or sea (*Pope*). 4. To make a loud noise (*Milton*).

ROAR. *s.* (from the verb.) 1. The cry of the lion or other beast (*Thomson*). 2. An outcry of distress. 3. A clamour of merriment (*Sh.*). 4. The sound of the wind or sea (*Philips*). 5. Any loud noise (*Dryden*).

ROA'RER. *s.* (from *roar.*) A noisy brutal man (*Howel*).

ROA'RY. *a.* (better *rory*, *rores*, Lat.) Dewy.

To ROAST. *v. a.* (*rosten*, Germ. ȝeռoɼꝛoȝ, Saxon, roasted.) 1. To dress meat, by turning it round before the fire (*Swift*). 2. To impart dry heat to flesh (*Swift*). 3. To dress at the fire without water (*Bacon*). 4. To heat any thing violently (*Shakspeare*).

ROAST, for *roasted* (*Swift*).

To rule the ROAST. To govern; to manage; to preside (*Shakspeare*).

ROASTING. A chemical process, generally performed in crucibles, by which mineral substances are divided, some of their principles being volatilized and others changed, so as to prepare them for other operations.

ROB. (from *robe*, dense, Arab.) An old term in pharmacy for an inspissated juice.

To ROB. *v. a.* (*rober*, old Fr. *robbare*, Ital.) 1. To deprive of any thing by unlawful force, or by secret theft; to plunder (*Addison*). 2. To set free; to deprive of something bad. Ironical (*Shakspeare*). 3. To take away unlawfully (*Bacon*).

ROBBEN ISLAND, sometimes called Penguin Island, a barren sandy island, near the Cape of Good Hope, at the entrance into False bay. Lon. 18. 22 E. Lat. 33. 50 S.

RO'BBER. *s.* (from *rob.*) One that plunders by force, or steals by secret means; a plunderer; a thief (*Shakspeare*).

ROBBERY, is a felonious taking away of another man's goods from his person, or presence, against his will, putting him in fear, on purpose to steal the same. The value is immaterial.

If a man force another to part with his property, for the sake of preserving his character from the imputation of having been guilty of an unnatural crime, it will amount to a robbery, even though the party was under no apprehension of personal danger. If any thing is snatched suddenly from the head, hand, or person of any one, without any struggle on the part of the owner, or without any evidence of force, or violence being exerted by the thief,

it does not amount to robbery. But if any thing be broken or torn in consequence of the sudden seizure, it would be evidence of such force as would constitute a robbery: as where a part of a lady's hair was torn away by snatching a diamond pin from her head, and an ear was torn by pulling off an ear-ring; each of these cases was determined to be a robbery.

The hundred in which a robbery on the highway is committed, is liable to pay the damage when it is committed between the rising and setting of the sun, in any day, except Sunday, in case the robbers are not taken in forty days; hue and cry being made after the robber. And he who apprehends and prosecutes a robber on the highway, so as to convict him, is entitled to receive of the sheriff of the county where the robbery was committed the sum of forty pounds, with the horse, furniture, arms, &c. upon such person's producing a proper certificate from the judge before whom the robber was convicted.

ROBE *s.* (*robbe*, Fr. *robba*, Ital.) A gown of state; a dress of dignity (*Shakspeare*).

To ROBE. *v. a.* (from the noun.) To dress pompously; to invest (*Pope*).

ROBERGIA, in botany, a genus of the class decandria, order pentagynia. Calyx five-parted; petals five; drupe with a one-seeded nut, and a two-valved shell. One species; a Guiana shrub, with alternate, pinnate leaves, and corymbed panicle.

ROBERT DE COURTENAY, French emperor of the East after his father Peter, 1218, was a weak prince, under whom the empires of Trebizond and Thessalonica were established. He died of grief 1228, because his wife had been mutilated by a gentleman of Burgundy to whom she had been formerly betrothed.

ROBERT, elector palatine, was emperor, 1400. He alienated the German princes from his government by his attachment to the antipope Gregory XII. and died 1410, aged 58.

ROBERT, king of France, surnamed the Wise or the Devout, succeeded his father Hugh Capet, 996. He married Bertha of Burgundy: but as she was his cousin, this union was annulled by Gregory V. and the monarch afterwards took for his second wife Constance of Arles and Provence. He refused the crown of the empire and of Italy, better satisfied to reign over his native dominions. He died 1031, aged 60.

ROBERT the Magnificent, duke of Normandy, succeeded his brother Richard 1028. In 1035 he undertook a pilgrimage to the Holy Land, and on his return was poisoned in Bithynia. He was succeeded by his natural son William, better known as the Conqueror.

ROBERT, Short Shanks, was son of William the Conqueror, and obtained the dukedom of Normandy. He was in the holy wars, but on his return he found himself stripped of the throne of England, and afterwards he lost Normandy, and being made prisoner by his brother Henry, remained in cruel captivity till his death in 1134.

ROBERT BRUCE, a Scotch nobleman, who disputed the crown with John Baliol. The influence of Edward I. of England, prevailed in favour of his rival; but after his deposition, he escaped from retirement, and was unanimously elected king. He defeated the English at the famous battle of Bannockburn, 1314. Peace was afterwards re-established, and Robert advanced the happiness and the prosperity of his subjects. He died 1329, and desired that his heart might be buried in the holy sepulchre of Jerusalem. He was succeeded by David II.

ROBERT (Nicholas), of Langres, was eminent as a painter. His birds and plants, painted chiefly on vellum, were deservedly admired. He died 1684, aged 74.

ROBERT DE VAUGONDY (N.), a French geographer of Paris. His atlas, in 108 maps, is well known. He wrote abridgement of the different systems of the world—introduction to geography, &c. and died at Paris 1766, aged 78.

ROBERT (Herb). See GERANIUM.

ROBERTSON (Dr. William), was born at Dublin in 1705, but took the degree of M. A. in the university of Glasgow, from whence he returned to Ireland, and entering into orders, he obtained some considerable livings, which he quitted on embracing the Arian doctrines in 1764, and in 1766 he published his apology to his friends for what he had done, and soon after left Ireland. He presented one of his books to his *alma mater* the university of Glasgow, and received in return a degree of D. D. The company of merchant taylors being patrons of the grammar school at Wolverhampton, presented him with the mastership of it, and in that office he died in 1783.

ROBERTSON (William), a celebrated Scotch historian and divine, was born in 1721, and educated at the university of Edinburgh, where he proceeded to his degree of D. D. His greatest works are the history of Charles the Fifth, and the history of America, which are above all praise. He also wrote a history of Scotland, and an historical disquisition concerning India. Though his pulpit discourses were very masterly compositions, only one has been published. He was principal of the university of Edinburgh, historiographer for Scotland, one of his majesty's chaplains for that kingdom, and a minister of the Old Grey Friar's parish, Edinburgh. He died in 1793.

ROBERVAL (Giles-Personne), an eminent French mathematician, was born in 1602, at Roberval, a parish in the diocese of Beauvais. He was first professor of mathematics at the college of Maitre-Gervais, and afterwards at the college-royal. A similarity of taste connected him with Gassendi and Morin; the latter of whom he succeeded in the mathematical chair at the royal college, without quitting however that of Ramus.

Roberval made experiments on the Torricellian vacuum: he invented two new kinds of balance, one of which was proper for weighing air; and made many other curious experi-

ments. He was one of the first members of the ancient Academy of Sciences of 1666; but died in 1675, at 73 years of age. His principal works are,

I. A treatise of Mechanics. II. A work entitled Aristarchus Samos. He had several memoirs inserted in the volumes of the Academy of Sciences of 1666, viz. 1. Experiments concerning the Pressure of the Air. 2. Observations on the Composition of Motion, and on the Tangents of Curve Lines. 3. The Recognition of Equations. 4. The Geometrical Resolution of Plane and Cubic Equations. 5. Treatise on Indivisibles. 6. On the Trochoid, or Cycloid. 7. A Letter to Father Mersenne. 8. Two Letters from Torricelli. 9. A new kind of Balance.

ROBIN HOOD, a celebrated free-booter, who made Sherwood Forest, in Nottinghamshire, the grand haunt of himself and his associates in the reign of Richard I. He died in 1247.

Robin Hood Bay, a bay on the coast of Yorkshire, between Scarborough and Whitby, about one mile broad. Here is a village of fishermen, who supply the city of York, and the adjacent country, with all sorts of fish in their season. Lon. 0. 18 W. Lat. 54. 25 N.

Robin red-breast. See Motacilla.

ROBINIA, in botany, a genus of the class diadelphia, order decandria. Calyx four-cleft, the upper partition a little divided; legume gibbous, elongated. Twenty species; natives of Siberia or America. The following are cultivated.

1. R. pseud-acacia. False acacia. A spinous tree with pendulous white racemes, laburnum-like, with white flowers. It has several varieties.

2. R. hispida. Rose acacia, or robinia. Branchlets, peduncles, and calyxes bristly; flowers rosy.

3. R. caragana. Siberian abrupt-leaved robinia. Leaves abruptly pinnate in about four pairs; buds alternate, frequent, bearing both leaves and flowers.

4. R. frutescens. Shrubby robinia. Branches rodlike, pliant, loaded with leaves and flowers of a shining yellowish colour.

5. R. pygmæa. Dwarf robinia. A low shrub, seldom exceeding three feet; leaves in fours, sessile; flowers yellow.

6. R. spinosa. Thorny robinia. Stipules and petioles spinescent; the shrub about the height of a man: on account of its large stout thorns and the length and toughness of the branches, which, upon a trunk of not more than an inch and half in diameter, often extend to a fathom's length, this plant is admirably calculated to form impenetrable hedges, and is sufficiently hardy to bear our own climate.

7. R. violacea. Ash-leaved robinia. Tree upright, unarmed, twelve feet high; racemes axillary, half a foot long, with flowers of the smell and colour of violets.

8. R. mitis. Smooth Indian robinia. Shrubby, three feet high; racemes short, corols yellow.

The two last are the tenderest: all may be raised from seeds, cuttings, layers, and suckers; but the two last must have the seeds or cuttings in pots of light earth plunged into a hot-bed.

ROBINS (Benjamin), an English mathematician and philosopher of great genius and eminence, was born at Bath in Somersetshire, 1707. His parents were of low condition, and Quakers; and consequently neither able from their circumstances, nor willing from their religious profession, to have him much instructed in that kind of learning which they are taught to despise as human. Nevertheless, he made an early and surprising progress in various branches of science and literature, particularly in the mathematics; and his friends being desirous that he might continue his pursuits, and that his merit might not be buried in obscurity, wished that he could be properly recommended to teach that science in London. Accordingly, a specimen of his abilities, in this way, was sent up thither, and shown to Dr. Pemberton, the author of the View of sir Isaac Newton's Philosophy; who thence, conceiving a good opinion of the writer, for a further trial of his skill, sent him some problems, which Robins resolved very much to his satisfaction. He then came to London, where he confirmed the opinion which had been preconceived of his abilities and knowledge.

But though Robins was possessed of much more skill than is usually required in a common teacher; yet being very young, it was thought proper that he should employ some time in perusing the best writers, upon the sublimer parts of the mathematics, before he should undertake publicly the instruction of others. In this interval, besides improving himself in the modern languages, he had opportunities of reading, in particular, the works of Archimedes, Apollonius, Fermat, Huygens, De Witt, Slusius, Gregory, Barrow, Newton, Taylor, and Cotes. These authors he readily understood without any assistance, of which he gave frequent proofs to his friends: one was, a demonstration of the last proposition of Newton's Treatise on Quadratures, which was thought not undeserving a place in the Philos. Trans. for 1727.

Not long after an opportunity offered him of exhibiting to the public a specimen also of his knowledge in natural philosophy. The Royal Academy of Sciences at Paris had proposed, among their prize questions in 1724 and 1726, to demonstrate the laws of motion in bodies impinging on one another. John Bernoulli here condescended to be a candidate; and as his dissertation lost the reward, he appealed to the learned world by printing it in 1727. In this piece he endeavoured to establish Leibnitz's opinion of the force of bodies in motion from the effects of their striking against springy materials; as Poleni had before attempted to evince the same thing from experiments of bodies falling on soft and yielding

substances. But as the insufficiency of Poleni's arguments had been demonstrated in the Philos. Trans. for 1722; so Robins published in the Present State of the Republic of Letters, for May 1728, a Confutation of Bernoulli's performance, which was allowed to be unanswerable.

Robins now began to take scholars. About this time he quitted the dress and profession of a quaker; and, probably, without reflecting very much upon the subject of religion, he soon shook off the prejudices of his early habits. But though he professed to teach the mathematics only, he would frequently assist particular friends in other matters; for he was a man of universal knowledge; and the confinement of this way of life not suiting his disposition, which was active, he gradually declined it, and went into other courses that required more exercise. Hence he tried many laborious experiments in gunnery; believing that the resistance of the air had a much greater effect on swift projectiles, than was generally supposed. And hence he was led to consider those mechanic arts that depend upon mathematical principles, in which he might employ his invention; as the constructing of mills, the building of bridges, draining of fens, rendering of rivers navigable, and making of harbours. Among other arts of this kind, fortification very much engaged his attention; in which he met with opportunities of perfecting himself, by a view of the principal strong places of Flanders, in some journeys he made abroad with persons of distinction.

On his return home from one of these excursions, he found the learned here amused with Dr. Berkeley's treatise, printed in 1734, entitled The Analyst, in which an examination was made into the grounds of the doctrine of fluxions, and occasion thence taken to explode that method. Robins was, therefore, advised to clear up this affair, by giving a full and distinct account of Newton's doctrines, in such a manner as to obviate all the objections, without naming them which had been advanced by Berkeley, and accordingly he published, in 1735, a Discourse concerning the Nature and Certainty of Sir Isaac Newton's Method of Fluxions, and of Prime and Ultimate Ratios. This is a very clear, neat, and elegant performance; nevertheless some persons, even among those who had written against the Analyst, taking exception at Robins's manner of defending Newton's doctrine, he afterwards wrote two or three additional discourses.

In 1738, he defended Newton against an objection, contained in a note at the end of a Latin piece, called Matho sive Cosmotheoria puerilis, written by Baxter, author of the Inquiry into the Nature of the Human Soul: and the year after he printed Remarks on Euler's Treatise of Motion, on Smith's System of Optics, and on Jurin's Discourse of Distinct and Indistinct Vision, annexed to Dr. Smith's work.

In the mean time Robins's performances were not confined to mathematical subjects; for, in 1739, there came out three pamphlets upon political affairs, which did him great honour. The first was entitled, Observations on the present Convention with Spain; the second, A Narrative of what passed in the Common-Hall of the Citizens of London, assembled for the Election of a Lord Mayor; the third, An Address to the Electors and other Free Subjects of Great Britain, occasioned by the late Succession; in which is contained a particular Account of all our Negociations with Spain, and their Treatment of us for above ten Years past. These were all published without our author's name; and the first and last were so universally esteemed, that they were generally reputed to have been the production of the great man himself, who was at the head of the opposition to sir Robert Walpole. They proved of such consequence to Mr. Robins, as to occasion his being employed in a very honourable post; for, the patriots at length gained ground against sir Robert, and a committee of the house of commons being appointed to examine into his past conduct, Robins was chosen their secretary. But after the committee had presented two reports of their proceedings, a sudden stop was put to their further progress, by a compromise between the contending parties.

In 1742, being again at leisure, he published a small treatise, entitled New Principles of Gunnery; containing the result of many experiments he had made, by which are discovered the force of gunpowder, and the difference in the resisting power of the air to swift and slow motions. To this treatise was prefixed a full and learned account of the progress which modern fortification had made from its first rise; as also of the invention of gunpowder, and of what had already been performed in the theory of gunnery. It seems that the occasion of this publication was the disappointment of a situation at the Royal Military Academy at Woolwich. On the new modelling and establishing of that academy, in 1741, our author and the late Mr. Muller were competitors for the place of professor of fortification and gunnery. Mr. Muller held then some post in the Tower of London, under the Board of Ordnance, so that, notwithstanding the great knowledge and abilities of our author, the interest which Mr. Muller had with the Board of Ordnance carried the election in his favour. Upon this disappointment Mr. Robins, indignant at the affront, determined to show them, and the world, by his military publications, what sort of a man he was whom they had rejected.

Upon a discourse containing certain experiments being published in the Philos. Trans. with a view to invalidate some of Robins's opinions, he thought proper, in an account he gave of his book in the same Transactions, to take notice of those experiments: and in consequence of this, several dissertations of his on the resistance of the air were read, and the experiments exhibited before the Royal Society, in 1746 and 1747; for which he was presented with the annual gold medal by that society.

In 1748, came out Anson's Voyage round the World; which, though it bears Walter's name in the title-page, was, in reality, written by Robins. Of this voyage the public had for some time been in expectation of seeing an account, composed under that commander's own inspection: for which purpose the reverend Richard Walter was employed, as having been chaplain on board the Centurion, the greatest part of the expedition. Walter had accordingly almost finished his task, having brought it down to his own departure from Macao for England; when he proposed to print his work by subscription. It was thought proper, however, that an able judge should first review and correct it, and Robins was appointed; when, upon examination, it was resolved that the whole should be written entirely by Robins, and that what Walter had done being mostly taken, verbatim, from the journals, should serve as materials only. Hence it was that the whole of the introduction, and many dissertations in the body of the work, were composed by Robins, without receiving the least hint from Walter's manuscripts; and what he had transcribed from it regarded chiefly the wind and weather, the currents, courses, bearings, distances, offings, soundings, moorings, the qualities of the ground they anchored on, and such particulars as usually fill up a seamen's account. No production of this kind ever met with a more favourable reception, four large impressions having been sold off within a year: it was also translated into most of the European languages; and it still supports its reputation, having been repeatedly reprinted in various sizes. The fifth edition, at London, in 1749, was revised and corrected by Robins himself; and the ninth edition was printed there in 1761.

Thus becoming famous for his talents in elegant writing, he was requested to compose an apology for the unfortunate affair at Preston-Pans in Scotland. This was added as a preface to the report of the proceedings and opinion of the board of general officers on their examination into the conduct of lieutenant-general sir John Cope, &c. printed at London in 1749; and this preface was esteemed a master-piece in its kind.

Robins had afterwards, by the favour of lord Anson, opportunities of making farther experiments in gunnery; which have been published since his death, in the edition of his works by his friend Dr. Wilson. He also not a little contributed to the improvements made in the Royal Observatory at Greenwich, by procuring for it, through the interest of the same noble person, a second mural quadrant, and other instruments; by which it became perhaps the completest of any observatory in the world.

His reputation being now arrived at its full height, he was offered the choice of two very considerable employments. The first was to go to Paris, as one of the commissaries for adjusting the limits in Acadia; the other, to be engineer-general to the East India Company, whose forts, being in a most ruinous condition, wanted an able person to put them into a proper state of defence. He accepted the latter, as it was suitable to his genius, and as the company's terms were both advantageous and honourable. He designed, if he had remained in England, to have written a second part of the Voyage round the World; as appears by a letter from lord Anson to him, dated Bath, Oct. 22, 1749, as follows.

"Dear Sir, when I last saw you in town, I forgot to ask you, whether you intended to publish the second volume of my voyage before you leave us; which I confess I am very sorry for. If you should have laid aside all thoughts of favouring the world with more of your works, it will be much disappointed, and no one in it more than your very obliged humble servant, "ANSON."

Robins was also preparing an enlarged edition of his New Principles of Gunnery: but, having provided himself with a complete set of astronomical and other instruments, for making observations and experiments in the Indies, he departed hence at Christmas in 1749; and after a voyage, in which the ship was near being cast away, he arrived at India in July following. There he immediately set about his proper business with the greatest diligence, and formed complete plans for Fort St. David and Madras: but he did not live to put them into execution. For the great difference of the climate from that of England being beyond his constitution to support, he was attacked by a fever in September the same year; and though he recovered out of this, yet about eight months after he fell into a languishing condition, in which he continued till his death, which happened the 29th of July 1751, at only 44 years of age.

It is but justice to say, that Mr. Robins was one of the most accurate and elegant mathematical writers that our language can boast of; and that he made more real improvements in artillery, the flight and the resistance of projectiles, than all the preceding writers on that subject. His New Principles of Gunnery were translated into several other languages, and commented upon by several eminent writers. The celebrated Euler translated the work into the German language, accompanied with a large and critical commentary; and this work of Euler's was again translated into English in 1714, by Mr. Hugh Brown, with notes, in one volume 4to. A new edition of Robins's original work has been recently published, with a few brief but valuable notes, by Dr. Hutton.

ROBINSON (Robert), a writer of considerable celebrity among the English baptists, was born at Swaffham, in Norfolk, about 1735, and educated at the grammar-school of his native town. His parents being poor, he was put apprentice to a hairdresser; but after reaching years of maturity, having been much impressed by the preaching of the Calvinistic or Whitfieldean methodists, he relinquished his business to become a preacher amongst them. After a few years he adopted the sentiments of

the baptists, with respect to the proper subjects of baptism as well as the proper mode of administering that ordnance, and from that time united himself with persons of that persuasion. He was soon invited to become pastor of the church and congregation of baptists, at Cambridge; and being a man of very fascinating manners as well as of considerable talents, he formed intimacies with many of the most eminent men in the university both among the clergy and laity. In consequence of this, he was indulged with the free and almost unlimited use of books from the public library there, as well as from several of the college libraries; a circumstance which was of great importance to him, both in the way of storing his own mind, and of laying in a stock of information to be employed in his several historical and polemical works.

One of the most celebrated of his productions is his Plea for the Divinity of Jesus Christ, first published in the year 1776; and which is doubtless one of the most able defences of that important article of the Christian faith which was ever printed. His biographer, Mr. Dyer, however, affirms, that before he published this Plea, he began to entertain considerable doubts upon the subject; and it is certain that in a few years he sunk into Arianism, afterwards there is reason to believe into Socinianism; and, a short time before he died, he declared to Dr. Priestley, that his arguments alone preserved him from infidelity!

Possessing remarkable extemporaneous talents as a preacher, he was extremely popular; and there is reason to fear he would have led many of his numerous admirers to adopt his erroneous notions, had his life continued long after this change of sentiments. But, conformably to the wish he had often expressed, he died suddenly. He died in the summer of 1790, at Birmingham; being found dead in his bed, after having preached for Dr. Priestley.

Mr. Robinson was a man of extensive powers, and of some genius, as well as of indefatigable industry. But his productions are in general indicative of some peculiar bias. Besides the work abovementioned, he published several others, viz. A translation of Claude's Essay on the Composition of a Sermon, in 2 vols. 8vo. with an immense assemblage of notes, most of them very ludicrous ones, to illustrate the excellencies and defects in pulpit compositions. A History of Baptism, and Ecclesiastical Researches, both in 4to. These are elaborate works, but evidently marked with the author's strong and prevailing bias against orthodoxy and establishments. A Syllabus of a Course of Lectures on Nonconformity, and the History and Mystery of Good Friday; the latter of these is a very humorous essay, but marked, as usual, with the author's peculiarities. The Political Catechism, Dissenting Minister's Companion, and various single sermons. He also translated several of Saurin's sermons, and published them in 4 octavo vols. with very ingenious and able prefaces in defence of liberty of conscience, &c. in some of which, however, he has pushed his principles farther than many pious men among the dissenters would wish to see them carried. There is likewise an interesting volume under the title of Village Sermons and Morning Exercises, some of which are exquisitely beautiful in point of composition; but approaching to nothing like precision and clearness of doctrinal sentiment.

Very amusing Memoirs of Mr. Robinson were published by Mr. Dyer, in 1 vol. 8vo. and an abridgment of these, by Mr. B. Flower of Harlow, as an introduction to an edition of Robinson's Miscellaneous Works, in 4 vols. 8vo.

We cannot describe the nature and extent of Mr. Robinson's powers more correctly than by saying, he had the same kind of versatility, of acuteness, and of playfulness as Voltaire, and often the same habit of writing between jest and earnest, so that his real meaning should not be readily seen. Had Voltaire been a baptist minister, he would have been talked of as much as Mr. Robinson, but no more. Had Mr. Robinson been an infidel, and not lost any of his activity, he would have been as highly celebrated throughout the world as Voltaire. Had both of them been clergymen, and actuated solely by a desire to do good, and not at all by a wish to startle, to puzzle, or to dazzle, we are not sure that either would have been often mentioned, except by their surviving personal friends, 20 years after their death.

ROBINSON CRUSOE'S BOAT, in botany, a species of CACTUS, which see.

ROBINSONIA, in botany, a genus of the class icosandria, order monogynia. Calyx five-toothed; petals five; berry striate, two-celled; the cells one-seeded; seeds villous. One species; a Guiana tree with alternate, unevenly pinnate leaves; leaflets lanceolate, pointed, serrate; flowers minute, yellow, in a terminal panicle; berry the size of a cherry, eatable, and of a very grateful acid taste.

ROBISON (John), LL.D. an eminent philosopher, was born in Scotland, about 1733. After having received a liberal education in his native country, he went to Russia, where he was appointed director of the marine cadet academy at Cronstadt, an appointment which he held for several years. On his return to Scotland he was appointed professor of chemistry in the university of Glasgow, and shortly after he was invited to fill the chair of natural philosophy professor at Edinburgh. This latter situation he filled with great honour to himself and great benefit to the students of that university, till his death, which happened early in the year 1805.

Although Dr. Robison laboured under a most distressing and painful disorder during the last eighteen years of his life, still his mind was always active, and generally directed to the most beneficial purposes. He is well known as the author of most of the mathematical and philosophical articles in the third edition of the Encyclopædia Britannica, and

the supplement to that valuable work. Those articles are of established character, and, although several of them are written in a very desultory manner, yet they are rich in important remarks and useful information. They appear to have been the substance of his lectures delivered in the college; and some of them were afterwards thrown into an improved form, and published under the title of Elements of Mechanical Philosophy, of which we believe only one large 8vo. vol. has yet been published. Dr. Robison also published in 1797, Proofs of a Conspiracy against all the Religions and Governments of Europe, carried on in the Secret Meetings of Free Masons, Illuminati, and Reading Societies; a work which made a great impression at the time of its first appearance, and rapidly passed through four or five editions. In 1803 he published a very valuable edition of Dr. Black's Lectures on the Elements of Chemistry, accompanied by much interesting disquisition and history, by the editor.

Altogether Dr. Robison may very justly be considered as one of the most eminent philosophers ever produced in Scotland. He was doubtless inferior to Gregory and Maclaurin; yet he had a very extensive acquaintance with chemistry and with pure and mixed mathematics; and he had a most happy talent at converting the knowledge he possessed to important practical purposes. We regret that, for want of more particulars, we have been compelled to offer so scanty a memoir of so eminent a man. But all who are able to appreciate his profound acquirements will revere the man, however little they know of his life: and, notwithstanding the deservedly high character of his successor, we do not wonder that some of the students at Edinburgh are still applying to Dr. Robison the language of Hamlet: "He was a man, take him for all in all we shall not look upon his like again."

ROBORANTS. (*medicamenta roborantia*, from *roboro*, to strengthen.) Strengthening medicines. See STIMULANTS.

ROBO'REUS. *a.* (*robur*, Lat.) Made of oak.

ROBU'ST. ROBU'STIOUS. *a.* (*robustus*, Lat.) 1. Strong; sinewy; vigorous; forceful (*Milton*). 2. Boisterous; violent; unwieldy (*Dryden*). 3. Requiring strength (*Locke*).

ROBU'STNESS. *s.* (from *robust.*) Strength; vigour (*Arbuthnot*).

ROCA (Cape), the most western extremity of Portugal, and of Europe. On its summit is a remarkable monastery, said to be 3000 feet above the sea; and on the E. of the mountain is a summer palace, of Moorish architecture. Here is also a small vineyard, that of Carcavella, yielding a peculiar grape; and the environs supply most of the fruits and greens used at Lisbon. This cape is called generally by the English sailors, the Rock of Lisbon. Lon. 9. 36 W. Lat. 38. 42 N.

ROCAMBOLE, in botany. See ALLIUM.

ROCCELLA. The principal use of this plant, lichen roccella of Linnæus, is as a blue dye. It has been employed medicinally with success in allaying the cough attendant on phthisis, and in hysterical coughs.

ROCHDALE, a town in Lancashire, with a market on Tuesday, and manufactures of bays, flannels, serges, and other woollen goods. It has two churches; and a canal from Manchester passes hence to the Calder navigation, near Halifax. It is seated on the river Roch, at the foot of the Yorkshire hills, 13 miles N. by E. of Manchester, and 198 N.N.W. of London.

ROCHE, or ROCHE EN ARDENNES, a town of the Netherlands, in the late duchy of Luxemburg, with a strong castle, seated on a rock, near the river Ourte, 22 miles S. of Liege, and 32 N.W. of Luxemburg.

ROCHE ALUM. See ALUMEN.

ROCHE POSAY, a town of France, in the department of Vienne. It has a mineral spring, and is seated on the Creuse, 32 miles E.N.E. of Poitiers.

ROCHE SUR YON, a town of France, in the department of Vendee, seated near the Yon, 20 miles N.W. of Lucon.

ROCHECHOUART, a town of France, in the department of Upper Vienne, with a castle on a mountain; seated near a rivulet that flows into the Vienne, 18 miles W. of Limoges.

ROCHEFORT, a town of the Netherlands, in the late duchy of Luxemburg, with a castle, said to have been built by the Romans. It it situate on the Somme, surrounded by rocks, 50 miles N.W. of Luxemburg. Lon. 5. 10 E. Lat. 50. 12 N.

ROCHEFORT, a seaport of France, in the department of Lower Charente, with a commodious harbour, one of the most famous in France. It stands on the Charente, 15 miles from its mouth, which is defended by several forts. The streets are broad and straight; the houses low, but regular; and it is supposed to contain 10,000 inhabitants. It has a magnificent hospital, spacious barracks, the finest hall of arms in France, a noble arsenal, a ropeyard, a foundry for cannon, and all the other magazines necessary for the construction and equipment of ships of war. It is 18 miles S.S.E. of Rochelle, and 127 S.W. of Paris. Lon. 0. 54 W. Lat. 46. 3 N.

ROCHEFORT, a town of France, in the department of Morbihan, 17 miles E. of Vannes, and 40 S.W. of Rennes. Lon. 2. 26 W. Lat. 47. 42 N.

ROCHEFORTIA, in botany, a genus of the class pentandria, order digynia. Calyx five-parted; corol funnel-form, with the throat open; fruit two-celled, many-seeded. Two species; shrubs of Jamaica.

ROCHEFOUCAULT, a town of France, in the department of Charente, with a castle. It is seated on the Tardouere, 12 miles N.W. of Angoulême, and 208 S. by W. of Paris. Lon. 0. 29 E. Lat. 45. 46 N.

ROCHEFOUCAULT (Francis duke of), an eminent French genius, born in 1613. He wrote a collection of Maxims, which Voltaire

says, "contributed more than any performance to form the taste of the French nation, and give it a true relish of propriety and correctness." He wrote also Memoirs of the Regency of Anne of Austria. He died in 1680.

ROCHELLE, a fortified town of France, in the department of Lower Charente, with a commodious and safe harbour. It was lately a bishop's see, contains 16,000 inhabitants, and has five gates. The houses are supported by piazzas, under which persons may walk in all weathers. Lewis XIII. took this place from the Huguenots, in 1628, after a siege of 13 months, during which the inhabitants suffered all the horrors of famine, only 4000, out of 15,000, surviving the siege. To prevent the English throwing in succours by sea, cardinal Richelieu constructed a prodigious mole, 4482 feet in extent. The inhabitants carry on a considerable trade, especially in wines, brandy, sugar, salt, paper, linen, and serges. Rochelle is seated on the bay of Biscay, 67 miles N. by E. of Nantes, and 220 S.W. of Paris. Lon. 1. 4 W. Lat. 46. 9 N.

ROCHELLE SALT. See TARTRIS SODÆ.

ROCHESTER, a city in Kent, with a market on Wednesday and Friday. It is governed by a mayor, sends two members to parliament, and was formerly much larger than at present. Its castle, now in ruins, once rendered it of great importance; and here also are some remains of a priory. Rochester is a bishop's see, and has, besides the cathedral, three parish churches. The inhabitants are chiefly tradesmen and innkeepers; no sort of manufacture being carried on here. It has two freeschools, one called the king's and the other the city school. Here is also an almshouse for six poor travellers, who are supplied with a supper, a bed, and a breakfast, with fourpence to carry them forward on their journey; but they are to stay no longer than one night; and an inscription over the door intimates, that rogues and proctors are excepted. The corporation has jurisdiction over the great oyster-fishery in the several creeks of the Medway. Rochester is parted from Stroud on the W. by its bridge, and it is contiguous to Chatham on the E. It is seated on the Medway, 27 miles N.W. of Canterbury, and 30 S.E. of London. Lon. 0. 36 E. Lat. 51. 23 N. See BRIDGE.

ROCHESTER, a village in Northumberland, on the Watling-street, N.W. of Otterbrun, and near the source of the Read. It has some Roman altars, inscriptions, and other antiquities.

ROCHESTER (Earl of). See WILMOT.

RO'CHET. *s.* (*rochet*, Fr.) 1. A surplice; the white upper garment of the priest officiating (*Cleaveland*). 2. (*rubellio*, Lat.) A fish (*Ainsworth*).

ROCHFORD, a town in Essex, with a market on Thursday, 16 miles S.E. of Chelmsford, and 40 E. by N. of London. Lon. 0. 41 E. Lat. 51. 36 N.

ROCK. *s.* (*roc*, *roche*, Fr. *rocca*, Ital.) 1. A vast mass of stone (*Pope*). 2. Protection; defence. A scriptural sense. 3. (*rock*, Dan.) A distaff held in the hand, from which the wool was spun by twirling a ball below (*Ben Jonson*).

To ROCK. *v. a.* (*rocquer*, Fr.) 1. To shake; to move backward and forward (*Boyle*). 2. To move the cradle in order to procure sleep (*Dryden*). 3. To lull; to quiet (*Shakspeare*).

To ROCK. *v. n.* To be violently agitated; to reel to and fro (*Young*).

ROCK, a stony mass, consisting either of one or more materials, forming a portion of the solid surface of the globe.

The study of the general nature and composition of rocks constitutes that branch of mineralogy which, under M. Werner's system, is denominated *oryctology*, and which contemplates them under the five following distinct classes:

1. Primitive, or those which lie lowest and form the bases of all the rest; which are altogether chemical or crystallized compositions, and evince not the smallest portion of carbonaceous matter, or animal or vegetable relics. M. Werner supposes these to have been produced or consolidated first when the earth issued from a state of chaos, and hence their classific name.

2. Transition rocks; consisting of those that, excepting when the general order is broken in upon, lie immediately over the primitive rocks; and evince proofs of animal and vegetable relics though of the lowest kinds, and, of these kinds, limited to species at present not known to be extant. M. Werner hence supposes this class to have been produced next, in the order of creation, to the preceding, and at a time when the rude face of the earth was passing from an inorganic to an organic state, and from an uninhabited to an inhabitable condition; and it is on this account he has denominated them *transition rocks*.

3. Floetz, or horizontal rocks; supposed to be of still later origin than the preceding; evincing larger examples of animal and vegetable remains, and great abundance of carbonaceous matter. The classific name is taken from the flatter and more stratified appearance which these rocks evince; and they comprise those which, from their containing such frequent proofs of animal and vegetable or secondary matters, have been called by many writers *secondary rocks*.

4. Alluvial rocks. These constitute by far the greatest portion of the actual surface of the earth; and have been washed down by rains and other causes from the older and loftier mountains, and consequently consist of a great multiplicity of materials combined together, as sand, gravel, loam, &c.

5. Volcanic rocks, the name for which sufficiently explains its own meaning.

Let us take a brief view of them under this general division.

I. PRIMITIVE ROCKS.

The meaning of the classific term we have explained already. Werner has adopted it from Lehman, along with the outline of his system. The following is the arrangement of the class.

1. Granite,
2. Gneiss,
3. Micaceous shist,
4. Argillaceous shist,
5. Porphyry,
6. Sienite,
7. Serpentine,
8. Primitive limestone,
9. Primitive trap,
10. Quartz,
11. Topaz-rock,
12. Kieselchiefer, or flint slate.

Granite is composed essentially of felspar, quartz, and mica, crystallized and united to each other. It lies the lowest of all the rocks, and whenever from any particular cause it is left naked and is not covered by the rest, it rises highest and forms the substance of our loftiest chains of mountains. It contains few ores; those of gold and tin are sometimes found in it.

Gneiss is composed of the same elements as granite, but its particles are coarser, and form plates, which are laid on each other and separated by mica.

Micaceous shist consists of alternations of quartz and mica in distinct plates. The mica is usually most abundant. We meet with beds of other rocks in it, and also with most of the metals.

Argillaceous shist. This is chiefly slate; but often containing beds of quartz, felspar, shorl, hornblend, and pyrites. It usually covers micaceous shist. Ores are frequently found in it.

Porphyry. This term is applied to all rocks consisting of a compact ground in which distinct and separate crystals of some other substance are imbedded. M. Werner subdivides the porphyry rocks into the following species, each of which is denominated from its ground.

1. Hornstone porphyry. The hornstone is sometimes conchoidal, sometimes splintery, and of a red or green colour. The crystals are quartz and felspar.

2. Felspar porphyry. The ground is usually red. The crystals are felspar and quartz.

3. Sienite porphyry. The ground is a mixture of felspar and hornblende. The crystals are felspar and quartz.

4. Pitchstone porphyry. The ground is red or green, sometimes brown, and even black.

5. Clay porphyry. The ground is an indurated clay, commonly reddish, which sometimes passes into splintery hornstone. The crystals are felspar and quartz; sometimes it contains hornblende, and more rarely mica.

Porphyry mountains are not stratified, and contain no beds of foreign substances. They are not rich in ores, yet frequently contain veins worth working.

Sienite. This rock is composed essentially of crystals of felspar and hornblende, immediately and intimately united. The felspar usually predominates. When the felspar is compact, the rock assumes a porphyritic structure. It sometimes contains accidentally grains of quartz and mica, but in a very small proportion. Its texture is granular, rarely shistose. Seldom stratified. Does not contain foreign beds. It sometimes contains metallic veins. It usually covers porphyry.

Serpentine. This rock is essentially simple. Sometimes it contains accidentally talc, asbestus, and steatites; and sometimes mica, garnets, and granular limestone, magnetic ironstone, arsenical pyrites, &c. Serpentine rocks are not stratified. Seldom contain beds of foreign minerals. They contain few ores, and seldom any worth working.

Primitive limestone. This rock is essentially simple; its mass is granular limestone of a greyish white colour. Sometimes it is accidentally mixed with mica, quartz, hornblende, tremolite, actinote, asbestus, talc, &c. Its texture granular; the grains have a foliated texture, and a crystallized appearance. This rock sometimes contains metallic veins; chiefly of galena, magnetic ironstone, blende, and pyrites.

Primitive traps. The word trap is Swedish, and signifies a stair. It was applied by the Swedish mineralogists to certain rocks whose strata when exposed, the one jutting out under the other, gave an appearance somewhat like a stair. The term was adopted by other nations, and was applied indiscriminately to a great variety of rocks; which yet bore a certain resemblance to each other. This generalization, however, introduced much confusion into the subject, which was first cleared up by Werner and his disciples. Under the term traps Werner comprehends certain series of rocks, distinguished chiefly by the hornblende, which they all contain. In the most ancient, the hornblende is almost pure; this purity gradually diminishes, and in the most recent traps the hornblende degenerates to a kind of indurated clay. There are, then, three formations of traps; 1. Primitive traps; 2. Transition traps; 3. Secondary traps. The first only occupy our attention at present.

The primitive traps are composed almost entirely of hornblende. It is sometimes mixed with felspar, more rarely with mica and pyrites. There are four species; 1. Common hornblende; 2. Shistose hornblende; 3. Primitive grunstein; 4. Shistose grunstein.

1. Common hornblende is a simple rock. Its grains are sometimes so small that it appears compact. Sometimes it contains mica.

2. Shistose hornblende occasionally contains quartz, actinote, and pyrites.

3. Primitive grunstein is a mixture of hornblende and felspar. It is divided into different varieties, according as its texture is granular or compact. 1st. Common grunstein, in which the hornblende and felspar are intimately united. It resembles a sienite, in which the hornblende predominates. 2d. Fine grained grunstein, in which are embedded crystals of felspar. Texture at once granular and porphyritic. 3d. When the grains become very fine, the grunstein becomes porphyritic. 4th. When the mass becomes entirely homogeneous, we have the green porphyry of the ancients.

4. Shistose grunstein is a rock composed of compact felspar, hornblende, and a little mica; sometimes it contains also quartz. Its texture is shistose. The hornblende and felspar occur nearly in equal proportion.

Grunstein often contains metallic veins.

Quartz. Considerable rocks occur composed entirely of quartz. Sometimes, indeed, they contain accidentally mica, felspar, tin, pyrites. The texture of these rocks is usually compact, but sometimes shistose.

Topasfels. This rock is composed of quartz, shorl, topaz, and lithomarga. The first three ingredients alternate in thin beds. Its texture is granular; its structure shistose. Very rare. It has been found only in Saxony, near Awerbach, forming a mountain called Schneckenstein. It rests upon granite, and contains no ores.

Kieselchiefer. Kieselchiefer, or siliceous shistus, often forms considerable rocks. Their texture is compact. They are often traversed by small veins of quartz. They contain no metallic substance.

II. Rocks of transition.

The rocks belonging to this class agree with those of the first in containing no remains of organized beings, or at least but seldom; but they have a considerable resemblance to those of the

third class. Werner considers them as forming the passage between the first and third class of rocks; hence their name. The following table contains a list of the transition rocks.

1. Transition limestone,
2. Grauwacke,
3. Transition traps.

Let us take a view of each of these in order.

Transition limestone. This rock is simple. Its mass is a limestone; sometimes granular, sometimes compact, according as its age approaches to primitive or secondary limestone. Fracture is somewhat splintery. Somewhat transparent. Its colours are variously mingled; often red or black with white veins. Seldom contains foreign substances. Sometimes shells are observed in its superior strata.

Sometimes it alternates with beds of argillaceous shistus, and sometimes with beds of mandelstein, as in Derbyshire. It usually covers argillaceous shistus. Seldom rises to any considerable height. Usually stratified. Strata very thick. Often contains metallic veins.

Grauwacke. There are two species of rocks of grauwacke, common and shistose.

Common grauwacke is a sandstone composed of grains of quartz, kieselchiefer, and argillaceous shistus agglutinated by a cement of clay. The grains are sometimes very small, sometimes as large as a hazel nut.

Shistose grauwacke is a simple shistose rock, which has a strong resemblance to argillaceous shistus, but differing in its position. It forms beds which alternate with common grauwacke.

Grauwacke rocks are traversed by veins of quartz. They contain sometimes shells and reeds petrified. They contain no foreign beds. These rocks are distinctly stratified. The strata do not run parallel to those of the other rocks on which they lie. They usually cover transition limestone, and do not rise to any great height. They are rich in ores.

Transition traps. The principal base of all the rocks belonging to this formation is grunstein. This constitutes many of the primitive traps; but in the transition traps, the mixture is much more intimate, the grain is much finer, and the mass much more homogeneous, and its constituents are more or less blended together. Transition traps consist principally of two species, mandelstein and globular trap.

1. Mandelstein or amygdaloid. By this term is implied all rocks composed of a compact ground, containing imbedded in it minerals of a round or almond form, or containing cavities of that form. They are distinguished into primitive, transition, and secondary mandelsteins. Transition mandelstein consists of a ground of shistose hornblende, decomposed and resembling wacken or ferruginous clay. The cavities are sometimes empty, sometimes full, and then they contain quartz and chalcedony. The toadstone of Derbyshire is referred to this species. It contains round masses of calcareous spar.

2. Globular trap. This is a shistose grunstein, partly decomposed and reduced to the state of a fine-grained wacken. It is composed of large spherical bodies, consisting of concentric layers; the central part being hardest.

Transition traps are not stratified. They form separate conical mountains, usually near those of transition limestone. They contain some metallic veins of copper, iron, tin, &c,

III. Floetz or secondary rocks.

These rocks are distinguished by the remains of organized bodies, which they contain abundantly. They are usually stratified. The following table contains a list of these different rocks, arranged according to the supposed time of their formation.

1. Sandstone,
2. Secondary limestone,
3. Chalk,
4. Gypsum,
5. Rock salt,
6. Pit coal,
7. Eisenthon,
8. Secondary traps.

Sandstone. This rock is composed of quartz, varying in size; sometimes also grains of kieselchiefer, and very rarely of felspar. These grains are cemented together, sometimes by means of clay, sometimes of marl or lime, and sometimes of quartz. The cement varies in quantity, but never predominates. The size of the grains varies much; when large, the rock is usually called pudding stone.

This rock is very distinctly stratified. The beds of it often alternate with beds of compact limestone, pit coal, oolite, and a species of sandstone shistus fine grained, and mixed with leaves of mica, which gives it the appearance of micaceous shistus. It contains few metallic ores of value. Sometimes cobalt is found in it.

Secondary limestone. This rock is simple, and composed of compact limestone. Occasionally it contains crystals of quartz, pyrites, &c. Shells occur very frequently in it. It is very distinctly stratified. Its beds are sometimes separated by beds of shistose bituminous marl and sandstone, and by tubereles of hornstone and flint often arranged in beds. It is often traversed by metallic veins, chiefly of galena, grey copper ore, malachite, &c.

Chalk. The strata of chalk may be considered perhaps as subordinate to those of secondary limestone. They consist entirely of chalk, sometimes interrupted by thin beds of flint in tubercles. Shells often occur converted into siliceous matter, and sometimes pyrites in spherical masses. No metallic ores ever occur in them.

Gypsum. The strata of gypsum usually occur in mountains alternating with those of sandstone, limestone, marl, clay, rock salt. They often contain foreign crystals; chiefly quartz, aragonite, boracite, garnet; sometimes they contain sulphur. Few petrefactions are found in them except the bones of quadrupeds. They contain scarcely any metallic ores. See Sulphat of lime.

Rock salt. The mountains which contain strata of rock salt are to be referred to a particular formation of gypsum, with which they usually alternate. They contain no ores.

Pit coal is found in two different formations. The first of these is distinguished particularly by the name of coal formation, or mountains of coal. They are usually composed of beds of, 1. Very brittle sandstone, containing often small particles of mica; 2. Another sandstone or pudding stone of very large grains; 3. Shistose clay; 4. Marl; 5. Limestone; 6. An argillaceous porphyry distinguished by the name of secondary porphyry; 7. Ferruginous clay; 8. Coal. The beds of coal vary in thickness and in number.

This formation of coal occupies countries of no great elevation. They occur chiefly at the bottom of chains, and in the intermediate valleys. The

strata of coal in the north of England belong to it.

Coal is found in other situations, especially in the secondary trap formation. Those of Scotland belong to this class.

Argillaceous ironstone. The beds of this mineral usually alternate with those of indurated clay, shistose clay, marl, brandschiefer, and sandstone. They frequently contain calamine mixed with galena. The impressions of plants and marine petrefactions are often observable in them. They usually form small insulated hills, and are not very common.

Secondary traps. The mountains of secondary traps are composed of various rocks; some of which belong exclusively to this formation; others are found also in other mountains. The rocks peculiar to secondary traps are, 1. Basalt; 2. Wacken; 3. Basaltic tufa; 4. Secondary mandlestein; 5. Porphyry shistus; 6. Graustein; and, 7. Secondary grunstein.

1. Basalt, considered as the mass of a mountain, is a rock more or less compound; usually it is of a porphyritic structure, has for its ground the mineral called basalt. It contains usually grains of olivine, augite, basaltic hornblende, magnetic ironstone, and sometimes leucite, felspar, quartz, &c.; sometimes also mica, actinote, chalcedony. Sometimes it assumes the structure of mandelstein. In that case its cavities are filled with zeolite, steatites, limestone, &c.

It usually appears in large separate masses, often prismatic. It is very common, often forming detached mountains.

2. Wacken sometimes forms beds in the secondary traps. It is usually between clay and basalt. It neither contains olivine nor augite, but crystals of basaltic hornblende, and above all of black hexahedral mica. This last substance distinguishes wacken from basalt, which very seldom contains it.

3. Basaltic tufa results from the decomposition of certain basalts. It consists of fragments of basalt, pieces of olivine, the remains of vegetables, &c. agglutinated by a cement of clay.

4. The amygdaloids or mandelsteins of the secondary traps have for their base a clay which seems to be a decomposed grunstein, often penetrated with siliceous matter. It has a good deal of resemblance to wacken, and sometimes passes into it; at other times it assumes a more compact texture, and passes into basalt. Its cavities are sometimes empty, sometimes filled with green earth, zeolite, limestone, &c.

5. Porphyry shistus is a rock whose structure is shistose, and its texture porphyritic. Its base is klingstein, containing grains of felspar and sometimes of hornblende. It has a good deal of resemblance to basalt, and often passes into it. But it is more nearly a chemical compound, being more transparent, sonorous, and hard.

6. Graustein is a rock composed of small grains of felspar and hornblende, which graduate into each other and form a mass almost homogeneous, of an ash grey colour. It contains olivine and augite.

7. Secondary grunstein, like the primitive and transition, is composed of hornblende and felspar; but its grains are less perfectly crystallised, and less intimately mixed. It usually covers rocks of basalt.

Such are the rocks peculiar to the secondary traps. They have all less or more of a crystallized structure; whereas the other minerals found in secondary traps, but not peculiar to them, are mechanical depositions. Wacken and basalt form the passage from the one to the other. The mechanical depositions, sand, clay, &c. are usually lowermost; they are covered by wacken. Some of the other substances always occupy the summits.

Trap mountains contain abundance of petrefactions, but no ores except some veins and grains of iron. They are usually insulated; very seldom forming chains. The mountains of basalt and porphyry shistus are usually conical. They are hardly ever covered by other rocks. They usually cover sandstone, coal, secondary limestone, shistose clay; and veins of them are not uncommon in primitive mountains.

IV. Alluvial rocks.

These consist of what are properly called soils; and are materials that formerly constituted a part of the preceding rocks, and have been detached from them by the operation of air, rain, rivers, or torrents, heat, light, and the aerial gasses, and have been carried forward from the higher to the lower grounds, intermixed in their course with a very large portion of animal and vegetable substances more or less decomposed, and in this state not unfrequently deposited in the beds of rivers, and even of the sea.

Those found in the higher grounds consist chiefly of gravel, sand, and irregular pebbles, occasionally intermixed with small nodules of metals, especially of gold and tin, that in like manner formerly constituted a part of the older and loftier mountains.

Those of the lower grounds are chiefly sand, loam, calctuff, or stalactitic tufa; proper earths, brown-coal, wood-coal, bituminous wood, and bog iron ore.

V. Rocks volcanic.

This name is given to all the minerals thrown out during volcanic eruptions. The most complete account of them has been given by Dolomieu, who devoted the greatest part of his life to the study of volcanoes. Part of his division was published by him in the Journal de Physique for 1794; and an abstract of the whole has been given by Brochant from notes taken during a course of geology given by Dolomieu in 1797. Volcanic products have been divided by this celebrated geologist into five classes: 1. Minerals modified by the fire of volcanoes; 2. Substances not modified by the fire, or thrown out unaltered; 3. Substances sublimed by the fire of volcanoes; 4. Minerals altered by the sulphurous acid vapours of volcanoes; 5. Volcanic minerals altered by the action of the atmosphere.

Minerals modified by the fire. This set of minerals is subdivided into two heads. The first comprehends those minerals which, though they have been modified by fire, yet exhibit no appearance of its action. The second consists of those which retain obvious marks of the action of fire. Those of the first head have been distinguished by the name of compact lavas; those of the second by the name of porous.

Compact lavas bear so close a resemblance to certain rocks of an origin not volcanic, that it is extremely difficult to distinguish them. Some have the appearance of basalt; others of granite, porphyry, and various secondary traps. Dolomieu divides them into four species according to their base.

1. Compact lavas with an argillo-ferruginous base. Their colour is usually black. Fracture

imperfectly conchoidal. Texture very compact. Sonorous. Smell argillaceous. Attract the magnetic needle. Very common in volcanic countries. Frequently contain crystals of augite, felspar, hornblende, garnet, leucite, olivine, mica. A specimen of the lava of Catania in Sicily, analysed by Dr. Kennedy, contained,

51.0 silica,
19.0 alumina,
14.5 oxyd of iron,
9.5 lime,
4.0 soda,
1.0 muriatic acid,

99.0

A specimen of the lava of Sta. Venere in Sicily he found to contain

55.78 silica,
17.50 alumina,
14.25 oxyd of iron,
10.00 lime,
4.00 soda,
1.00 muriatic acid,

97.5

Compact lava with a petrosiliceous base. Colour very variable, grey, black, and white; but all become white before the blow-pipe. Fracture conchoidal. Grain fine and compact. Smell slightly argillaceous. Does not affect the magnetic needle. Contains usually grains of felspar; sometimes of hornblende mica; and occasionally lucites.

Porous lavas. These consist of those lavas which are often employed as millstones and in buildings; as also of scorias, or those materials which either are or have a great resemblance to puzzolanas, or earthy matters ejected by volcanoes, and which make an excellent mortar with lime. They also include compact glasses; and porous glasses or pumice-stones, volcanic sands and ashes, and calcined materials.

The *minerals not modified by fire* are for the most part volcanic tufas, or substances which, without a change of structure, have been thrown out of the volcano, and are of some consequence in determining its interior composition.

The *sublimated matters* are usually gasses, and metallic bodies which have elevated along with them.

The *substances altered* by the sulphureous acid vapour of volcanoes are chiefly the lavas themselves, which are hence changed in colour, and rendered more pulverulent; the results of this action are for the most part alum and sulphats of lime, magnesia, and iron.

The *volcanic substances altered* by the action of the atmosphere are nearly of the same kind as the preceding, but submitting to a more gradual though a more extensive change.

Mountain rocks are simple, as when formed of limestone, clay-slate, serpentine, or any other simple fossil; and compound, when formed by the aggregations of simple fossils. The compound rocks are either cemented, formed of various parts brought together and connected by a cement, as in sand-stones, pudding-stones, and brecciæ; or are aggregated, being composed of parts existing originally on the spot where the masses are now found, and connected together by their original structure. They are also considered as simple aggregated, when one, as a base, includes the other; when the contained portion is in the form of grains or crystals, the structure is termed porphyritic; and when of a vesicular form, amygdaloidal: the double aggregated is when a smaller structure is contained in a larger, as granular slaty; or when the two structures exist near or beside each other; when the one not including the other is pointed out by a conjunction, as porphyritic and amygdaloidal.

The mountain masses themselves are either of a stratified or of a seamed structure. When the masses composing the rock are of one species, and disposed parallel to each other, those masses are termed strata; but when the mountain mass is composed of different species of rocks, thus disposed, it is said to be formed of beds. In the seamed structure, the seams of stratification, though parallel in one direction, intersect each other in another. The masses thus divided by these intersecting seams may be considered as distinct concretions, and may be instanced in the columnar formed. Straight and much thicker masses are also thus formed, by what is termed the tabular seamed structure, and large globular masses result from the large globular or massive structure.

By a rock formation Mr. Jameson understands "a determinate assemblage of similar or dissimilar rock masses, which are characterised by external and internal relations, as an independent whole, that is, as an unity in the series of rock formations." When the mass is uniform throughout, it constitutes a simple formation; but when dissimilar, a compound formation; and when these formations are repeated, the whole is denominated a series or suite of formations. When individual beds occur in different principal formations, as primitive trap in gneiss, mica-slate, &c. forming single independent wholes, which always continue the same, notwithstanding the difference of rocks in which they are imbedded, and still form members of a series of formations; they are considered as independent formations. The inclination of a stratum is the angle which the stratum forms with the horizon, and is determined by the quadrant. The dip is the point of the compass towards which the stratum inclines. The direction is the angle which the stratum makes with the meridian, and is determined by the compass. It is always at right angles to the dip. The form, and other visible characters, of many of the mountain rocks are frequently sufficient to point out their nature to the attentive observer. Granite is characterised by its very high and precipitous cliffs and peaks; gneiss is less lofty, and its summits are less steep and abrupt; and the mountains of mica slate are still less lofty, and bear more of a rounded form. Clay-slate mountains are generally less lofty than those already noticed, and their cliffs are still less steep and rough. Primitive limestone sometimes presents lofty peaks, like those of granite; but the mountains containing it in general assume the characters of gneiss, mica-slate, or clay-slate, with which it is in general found. Rocks of primitive trap are generally lofty, steep, and conical. "No rock," Mr. Jameson observes, "presents a greater variety of external appearance than the sand-stone. Its vallies are deep, rocky, and romantic; its hills are conical, steep, and cliffy; and it often presents grand colossal pillars, which, from their number, and variety of their shape, form most striking rocky scenes." Floëtz limestone assumes very different forms from those already particularised, being extended in large, flat hills, intersected by steep vallies. Chalk in some

situations forms hills of considerable height, which are generally rounded, with an extensive base.

The position, extent, and direction of the several strata of different formations, either taken with or without reference to the fundamental rock, yield very convincing testimony in favour of the opinions delivered by the celebrated Werner respecting the formation of the earth. (See GEOLOGY.) Previously to viewing the illustration of his theory in the formation of a suite of rocks, it may be necessary to particularise some of the peculiarities in the formation of different rocks, and to show the different terms by which they are expressed. The formations themselves are distinguished as universal or partial, and as unbroken or broken. The strata are considered as conformable or unconformable, with the direction of the fundamental rock; and overlying, when lying over the ends of the strata of the fundamental rock. They are said to be straight, when disposed in one direction on the fundamental rock: when they turn round it, leaving the top uncovered, mantle-formed; and when they also cover its extremities, saddle-formed. When concave, they are termed basin-shaped; and if the concavity is long, trough-shaped. Their upper extremities, appearing at the surface of the earth, are termed the outgoings of the strata: the outermost of the circles formed by these is the oldest in the concave (the basin and trough-shaped), and newest in the convex (the mantle and saddle-shaped). When detached portions occur on the summits of hills, they are called caps; when filling up hollow spaces, up-fillings; and when only on one side of a mountain, shield-formed.

It has been here said, according to the theory of Werner, that one class of mountains was deposited, by chemical formation from an aqueous solution, previous to the creation of vegetables and animals; that to these succeeded another class, in which materials mechanically separated were discoverable, formed during the passage of this globe into a habitable state; and that during the existence of animals and vegetables in considerable number, another (the latest) class was produced, in which mechanical deposits and remains of organized bodies exist in considerable quantity. Of these different classes of rocks, it may be expected, that the rocks of the earliest period would be found invested in various modes by those of later formation, and disposed in the order of their separation from the waters from which they derived their origin.

The rocks which exist in the Hartz appear to be beautifully illustrative of this successive deposition. In the centre a vast mass of granite rises through the other strata, and round this clay-slate is disposed in mantle-shaped strata. Gneiss and mica-slate not existing in this country, transition limestone succeeds to the clay-slate, and then grey wacké and grey wacké slate: the whole being wrapped round the granite in mantle-shaped strata, and invariably with lower and lower outgoings, corresponding to the newer and newer strata. To these the floëtz rocks succeed, the oldest of the floëtz resting on the newest of the transition; and the different floëtz rocks resting on each other according to their relative age. Last of all, the alluvial rocks are found in the lowest situations. We have thus, as Mr. Jameson observes, all the series of rocks, from the granite to the alluvial, marked with a diminishing level, in proportion to the newness of the strata.

ROCK ALUM, in mineralogy. See ALUMEN.

ROCK CRYSTAL, in mineralogy, a species of quartz. See QUARTZUM.

ROCK OIL, in mineralogy, a species of bitumen. See BITUMEN.

ROCK OUZEL. See TURDUS.

ROCK FISH. See GOBIUS.

ROCK ROSE, in botany. See CISTUS.

ROCK SALT, in mineralogy, fossil-salt, sal gem. *Steinsalz.* Wern. *Sal gemme.* Brock. Muriat of soda exists abundantly in a native state either as a solid fossil or dissolved in water, and in whatever way obtained constitutes our common or culinary salt.

In the former state it ranks as a peculiar mineral, that is highly entitled to attention, and is denominated rock-salt.

It is found in a cubic, fibrous, compact, and stalactitical shape; for which see the article MURIA. Its proper geological situation is between the oldest secondary gypsum and secondary sandstone. It forms continuous beds of great thickness, and often occurs in large solitary blocks; it is always accompanied by semi-indurated clay, for the most part strongly impregnated with salt; and alternates with beds of swinestone, gypsum, limestone and sandstone. The beds of salt are mostly below the surface of the ground, but it sometimes rises into hills of considerable elevation. At Cordova, according to Bowles, there is a hill between four and five hundred feet high, composed entirely of this mineral. The most celebrated mines are those of Wielicza in Galicia, Halle in Tyrol, Poland, Castile in Spain, and Cheshire in England. In the province of Lahor in Hindustan is a hill of rock-salt of equal magnitude with that near Cordova. The mines of Iletski in Russia yield vast quantities of this substance. It is so plentiful in the desert of Caramania, and the air is so dry, that it is there used as a material for building; it forms the surface of a large part of the northern desert of Lybia, according to Horneman; and is found abundantly in the mountains of Peru. It has a pure saline taste, without any mixture of bitterness; and crystallises in cubes when obtained by slow evaporation from its solution.

Of all these the most useful and manageable, if not the most abundant, is the rock-salt, found and so extensively manufactured in Cheshire; and we shall hence give the following account of it from a very valuable paper, lately communicated to the geological society by H. Holland, esq.

The Cheshire rock-salt, with a few exceptions, has yet been ascertained to exist only in the valleys of the Weaver and its tributary streams; in some places manifesting its presence by springs impregnated with salt; in other places being known by mines actually carried down into the substance of the strata. Between the source of the Weaver and Nantwich, it will be seen that many brine springs make their appearance; and in the latter part of this course, it would seem that brine might be obtained by sinking to some depth in any place near the banks of the Weaver. Proceeding down the stream, salt-springs occur again at Winsford, and in several situations between Winsford and Northwich. At Moulton, between these two places, a mine has been sunk into the body of rock-salt, and another also between Winsford and Middlewich. At Northwich the brine springs are very abundant, and here also many mines have been sunk for the purpose of working out the fossil salt. The springs occur again in several places further down the river, but none have been met with below Saltersford, about

two miles from Northwich. At Whitley, however, two miles north of the Weaver, and six miles from Northwich, a body of rock-salt is stated to have been met with in boring for coal.

On the course of the river Wheelock, brine springs have been found at Lawton, Roughwood, Wheelock, and again at Middlewich, where this stream unites itself with the Dane. At Lawton, a mine has been sunk into the rock-salt. In the valley of the Dane, no salt springs actually appear, but several circumstances indicate that brine has at some former period been discovered there, and this as high up the stream as the neighbourhood of Congleton. No springs have been found in the valley of Witton Brook, except at the part of it immediately adjoining the Weaver at Northwich.

The evidences of the presence of rock-salt occur in very few places out of these valleys, and even some of the excepted instances appear to have a local relation to the southern or central plain. This is the case with the salt springs of Dirtwich, in the south-western angle of Cheshire; with a spring of very weak brine lately found at Adderley, in the northern extremity of Shropshire; and probably also with other saline springs which occur in the contiguous parts of Flint and Denbighshire. At Dunham, however, in the north of Cheshire, we find a weak spring, which cannot strictly be considered as connected with the formations of the southern plain. At Barton and Adlington, in the southern parts of Lancashire, brine springs likewise appear; and it is not improbable that other instances of the same kind may occur in the northern portion of the great plain. It appears possible, however, that these weak springs may derive their saline contents, not from distinct subjacent beds of the fossil salt, but merely from beds of clay or argillaceous stone, strongly impregnated with particles of the muriate of soda.

The brines met with in this district are very generally formed by the penetration of spring or rain waters to the upper surface of the rock-salt, in passing over which they acquire a degree of strength, modified by several circumstances, which it would be needless to detail. Their average strength, however, appears to be much greater than that of the springs met with in Hungary, Germany, or France. At Winsford, Northwich, Anderton, Lawton, Roughwood, Wheelock, and Middlewich, where all the principal salt works are situated, the brine springs contain between twenty-five and twenty-six per cent. of the pure muriat of soda; and in some of the springs at Anderton, the proportion stands as high as 26·566 per cent. a very near approach to the perfect saturation of the brine. The earthy salts held in solution together with the muriat of soda are principally muriat of magnesia and sulphat of lime; the quantity of these varying from $\frac{6}{10}$ per cent. to 2 or to $2\frac{1}{2}$ per cent. in different springs. The brine being pumped out of the pits, is first conveyed into large reservoirs, and afterwards drawn off as it is wanted, into evaporating pans, made of wrought iron. Here heat is applied in a degree determined by the nature of the salt intended to be manufactured, and various additions are made to the brine, with a view either to assist the crystallization of the muriat of soda, or to promote the separation of the earthy salts. The latter exist in a very small proportion in the manufactured salt, and cannot be supposed in any degree to affect the uses to which it is applied. The importance of the Cheshire salt manufacture will be sufficiently obvious from the statement, that besides the salt made for home consumption, which annually amounts to more than 16,000 tons, the average of the quantity sent to Liverpool for exportation has not been less than 140,000 tons.

Though springs impregnated with salt occur in several parts of the Cheshire plain, it may be remarked that the rock-salt itself has only been worked into, near the banks of the Weaver and its tributary streams. It was first discovered at Marbury near Northwich, about one hundred and forty years ago, in searching for coal. This bed of rock was the only one worked for more than a century, when, in the same neighbourhood, a second and inferior stratum was met with, separated by a bed of indurated clay from the one previously known. This lower stratum was ascertained to possess at a certain depth a great degree of purity and freedom from earthy admixture; on which account, and from the local advantages of Northwich for exportation, the fossil salt is now worked only in the vicinity of this place.

The rock-salt of Northwich occurs, in two great strata or beds, lying nearly horizontally, but on different levels, and separated, the superincumbent from the subjacent stratum, by several layers of indurated clay or argillaceous stone. These intervening beds possess in conjunction a very uniform thickness of ten or eleven yards, and are irregularly penetrated by veins of the fossil salt. Though the evidence on the subject is not entirely of a positive nature, there seem strong grounds for believing that the beds of rock-salt at Northwich are perfectly distinct from any others in the salt district, forming what the Germans would call *liegende stöcke*, lying bodies or masses of the mineral. It will readily be conceived that there is much difficulty in acquiring precise information with respect to the extent and limitation of these great masses, and that there are many sources of error to which such an inquiry is liable. There are, however, a few leading facts upon which dependence may be placed, and which will be admitted to furnish fair grounds for deduction.

It would appear that the great beds of rock-salt at Northwich assume a general longitudinal direction from north-east to south-west, the line which has been traced upon them in this direction being a mile and a half in length, and no direct evidence existing that they may not extend further in these points; while their transverse extent, as measured by a line at right angles to the former, is much more limited, probably not exceeding in any place one thousand three hundred or one thousand four hundred yards. Several circumstances concur in giving probability to this statement. Let two parallel lines, drawn from NE to SW, with an intervening distance equal to about half their length, be employed to designate the supposed extent of the subjacent rock-salt. In a mine which approaches very nearly to the eastern limit of the area thus formed, the upper bed of rock-salt was actually worked through in an horizontal direction on this side, and discovered to be going off with a very rapid declivity. A similar fact has been stated with respect to another pit further to the south on the same line of boundary; but as the mine was destroyed many years ago by the ingress of fresh water, this statement is considerably more doubtful than the former. It may be remarked too, that in sinking for brine a little beyond, or out of the area, on this side, the brine

met with is of a very weak and inferior kind, and at a short distance altogether disappears. Appearances leading to the same conclusion of the sudden termination of the body of rock-salt occur on the opposite side of the area marking its extent. In a mine at the northern extremity of the western line of boundary, a shaft situated nearer to this line is fifteen yards deeper than another shaft immediately contiguous, apparently in consequence of the rapid sinking of the rock-salt at this point. In most of the pits on this side, the upper bed of rock is met with at a depth of from thirty to forty yards; yet at Barnton, a mile further to the west, and on the same or a lower level, none was met with in a sinking of one hundred and fifteen yards.

Corresponding appearances have been observed in the body of rock-salt which occurs at Moulton, between Winsford and Northwich, where in two sinkings on the same level, and at the distance of one hundred yards from each other, the difference in the depth at which the rock was found was nearly twenty yards, a circumstance from which the limitation or going off of the bed at this particular point may reasonably be inferred.

Another important observation with respect to the Northwich rock-salt is, that there seems to be a progressive thinning of the upper bed of salt from NW to SE, or in a direction nearly at right angles to the longitudinal extent of the stratum. Though much uncertainty exists with respect to the rate and progression of this decrease, the general fact seems to be sufficiently confirmed by observations taken from different mines. In those which have been sunk near to the western or north-western side of the area before described, the thickness of the upper bed has been very generally twenty-eight, twenty-nine, or thirty yards. Proceeding towards the east or south-east, we find this thickness decreasing to twenty-five yards, and in the mines near the eastern boundary the bed of rock-salt comes down to twenty, eighteen, and even seventeen yards in thickness. It will be observed that this thinning takes place in a general direction from the nearest sea coast; the thickest part of the body of rock being situated furthest down the Weaver, and just above the contraction which takes place in the valley of the river at Anderton.

Besides this general variation of surface in the superior stratum of rock-salt, it has been found that there is a considerable irregularity of level on its upper surface. In one of the mines, in which a tunnel was carried one hundred yards along this surface, many small risings and depressions were met with; and similar appearances have been observed in the other mines near Northwich.

The depth at which the upper bed of rock-salt is found, though varied by several of these circumstances, depends principally, of course, upon the surface of the ground above, which at Northwich, from the confluence of streams there, is somewhat irregular. In the greater number of the mines, it is met with at a depth varying from thirty-five to forty yards. The smallest depth at which it has been found is in a mine situated close to Witton Brook, about half a mile above the entrance of this stream into the Weaver. Here it appears at twenty-nine yards from the surface; and a general estimate of level from this mine shows that the upper surface of the salt is at least twelve or thirteen yards below the low-water mark of the sea at Liverpool; a fact perhaps not wholly unimportant as regards our ideas of the formation of this mineral.

The thickness of the upper bed of salt at Northwich has been already stated to vary from twenty to thirty yards: that of the lower bed has never yet been ascertained in any one of the mines in this district. The workings in this lower stratum are usually begun at the depth of from twenty to twenty-five yards, and are carried down for five or six yards, through what forms, as will afterwards be mentioned, the purest portion of the bed. In one of the mines a shaft has been sunk to a level of fourteen yards still lower, without passing through the body of rock-salt. We have thus an ascertained thickness of this bed, of about forty yards, and no direct evidence that it may not extend to a considerably greater depth.

Though only two distinct beds of the fossil salt have been met with at Northwich, it has been ascertained that the same limitations do not exist throughout the whole of the salt district. At Lawton, near the source of the river Wheelock, three distinct beds were found, separated by strata of indurated clay; one, at the depth of forty-two yards, four feet in thickness; a second, ten yards lower, and twelve feet thick; and a third, fifteen yards still further down, which was sunk into twenty-four yards, without passing through its substance. Coal is found and worked within two or three miles of this place, and the only limestone known in the county of Chester is got from the hills which here form the southern boundary of the plain. In no other parts of the salt district, than at Northwich and Lawton, has the upper bed of rock been worked through.

The strata passed through in going down to the upper bed of rock are nearly horizontal in position, and very uniform in their structure, consisting in every instance of beds of clay and marl; and these, with the exception of a few of the most superficial, appearing in similar progression in each mine. The clays, or argillaceous stone, of which these beds are composed, are indurated in different degrees, tinged with various shades of red, blue, brown, &c. and usually contain a portion of sulphat of lime. They are known to the miners by the general name of metals; a distinctive appellation being given to each from the shade of colour which it assumes. It will be observed that, though these clays in general possess a considerable degree of induration, there are some of them sufficiently porous to admit the passage of water through their substance. Where this structure of the clay occurs it goes by the name of the shaggy metal, and the fresh water which makes its way through the pores has the expressive appellation of Roaring Meg. This term will not appear too strong, when it is mentioned that in the mine from which the section of strata was taken, and where the shaggy metal was found at the depth of twenty-six yards, the quantity of water, ascertained to issue from its pores in one minute, was not less than three hundred and sixty gallons; a circumstance greatly enhancing the difficulties of passing a shaft down to the body of rock-salt.

A portion of salt, sufficient strongly to affect the taste, is found to exist in many of these beds of argillaceous stone: and this saltness increases, as might be expected, as we approach the body of the rock-salt. In the strata or layers immediately above the rock, which in all the mines are perfectly uniform in their appearance and structure, it is particularly remarkable. It may be observed, however, that there are not in these strata any veins of rock-salt connected with the great mass

below: on the contrary, the line of division between the clay and rock-salt is drawn with great distinctness in every instance, and presents none of those inequalities which would arise from a mutual penetration of the strata.

It may, perhaps, be considered as a decided fact, that no marine exuviæ or organic remains are found in the strata situated over the rock-salt; and the almost universal occurrence of gypsum, in connexion with beds of fossil salt, is another fact worthy of observation. This connection appears in the salt mines of Hungary, Transylvania, and Poland, as well as in those of Cheshire, and it has led Werner to assign to the rock-salt and flœtz gypsum a conjunct situation in his Geognostic System. The gypsum, contained in the clays over the Cheshire rock-salt, occurs in varying proportions, and under different appearances in the several beds passed through. It is found both in large masses and in small granular concretions. The compact, foliated, and fibrous varieties are all met with; the last of these occurring in very considerable proportion.

The fineness or purity of the rock is a circumstance very important to the interests of the mining proprietor, and in this point considerable varieties appear in different parts of the strata. The great body of the rock-salt, both in the upper and lower stratum, is composed of crystals of muriate of soda, intimately mixed with certain proportions of clay and oxyd of iron, giving to the mass a red or reddish-brown tinge; and, in addition to these constituent parts, contains likewise certain earthy salts, the sulphat of lime, and the muriats of lime and magnesia, but these in small proportion. In every part, however, of this compound rock, we find separate crystalline concretions of muriat of soda, variously disposed, sometimes occurring distinctly in the cubical form; in other places in masses of larger size, and irregularly shaped. The colour of these concretions, which are of the foliated species of fossil salt, is usually a greyish, or milk-white; they are always translucent, and often attain a considerable degree of transparency. It would appear that they contain the muriat of soda in its purest form; the sulphat of lime in specimens of this kind being scarcely distinguishable by the delicate tests applied to its discovery.

This finer rock-salt occurs not only in separate concretions, but also in veins intersecting the coarser mass, and in the rims or borders of the polyhedral figures which will afterwards be mentioned. Its proportion varies both in the two great beds of rock, and likewise in different parts of the same bed; and it is a regard to this circumstance which determines the situation and extent of the workings in the several mines. In the upper bed this variety is less considerable than in the lower; but here the substance of the rock-salt is evidently purer three or four yards above the lower surface than in other parts of the same stratum, and continues so for about four feet. In the lower bed, the first twenty or twenty-five yards passed through contain a proportion of earth as large as in the upper stratum: at this depth, however, a greatly increased degree of purity appears, which is continued for five or six yards further down, when the proportion of earthy admixture again becomes as large as before.

It is invariably this purer portion of the lower bed which is at present worked in the Northwich mines, and the rock-salt obtained from it, being principally exported to the Baltic, obtains the name of Prussian rock. The extent of the cavity formed by the workings varies in different mines; the average depth may probably be taken at about sixteen feet. In some of the pits, where pillars six or eight yards square form the supports of the mine, the appearance of the cavity is singularly striking, and the brilliancy of the effect is greatly increased if the mine be illuminated by candles fixed to the side of the rock. The scene so formed would almost appear to realize the magic palaces of the eastern poets. Some of the pits are worked in aisles or streets, but the choice here is wholly arbitrary. The methods employed in working out the rock-salt offer nothing worthy of notice. The operation of blasting is applied to the separation of large masses from the body of the rock, and these are afterwards broken down by the mechanical implements in common use. The present number of mines is eleven or twelve, from which there are raised, on an annual average, fifty or sixty thousand tons of rock-salt. The greater part of this quantity is exported to Ireland and the Baltic: the remainder is employed in the Cheshire district in the manufacture of white salt by solution and subsequent evaporation.

It is very doubtful whether in any instance the body of rock-salt can be considered as stratified, or disposed in distinct layers. A perpendicular section does sometimes indeed present irregular appearances of this kind, and more especially in the purer part of the lower bed; but the great body of the rock offers to the eye merely a confused red mass, varied here and there by the occurrence of the crystalline portions of salt.

One of the most striking facts connected with the internal structure of the Northwich rock-salt, is the appearance observable on the surface of an horizontal section of the rock, as viewed in any of the mines. On this surface may be traced various figures, more or less distinctly marked, and differing considerably in the forms which they assume; some appearing nearly circular, others perfectly pentagonal, and others again having an irregular polyhedral form. The lines which form the boundary of these figures are composed of extremely pure white salt, forming a division between the coarse red rock exterior to the figure, and the equally coarse rock included within its area. These bordering lines or rims vary from two to six inches in width. The figures themselves differ greatly in size; some of them being less than a yard in diameter, others as much as three or four yards; and they very frequently are observed, one within another, gradually diminishing in size to a centre. Professor Playfair, in his Illustrations of the Huttonian Theory, has stated, that the compression of these figures is always mutual; the flat side of one being turned to the flat side of another, and never an angle to an angle, nor an angle to a side. This remark seems perfectly founded in fact. From the mode of working the mines, it is difficult to ascertain the progressive appearance of these figures in a perpendicular plane. It has been stated that their form is a pyramidal one, the area enlarging by a determinate ratio of increase as they are traced downwards; but several circumstances induce us to consider this statement as a very doubtful one, and certainly founded upon insufficient evidence.

One very important negative fact remains to be mentioned with respect to the internal structure of the Cheshire rock-salt, viz. that no organic impressions or remains have ever been met with in any of the beds of the mineral which have been

worked in this district. This fact rests on evidence of a satisfactory kind, and there is not, perhaps, more than a single instance adduced in opposition to it, and that of a very dubious nature. The same remark may be applied to the strata of argillaceous stone between the two beds of rock-salt. The veins of rock-salt intersecting these intermediate strata contain principally the fibrous variety of the fossil. It may be remarked too of these strata, that at their junction with the upper and lower beds of rock-salt, the lines of division are nearly as distinct as that between the upper bed of rock and the superincumbent layers of argillaceous stone.

The general situation of the rock-salt in Transylvania and Poland is very similar to that which it occupies in Cheshire; the beds of this mineral being disposed in small plains, bounded by hills of inconsiderable height, forming a kind of basin or hollow, from which there is usually only a narrow egress for the waters. The situation of the Austrian salt-mines near Salzburgh is however very different. The mineral here appears to be disposed in beds of great thickness, which occur near the summit of limestone hills, at a great elevation above the adjoining country. This fact is a singular one; and, if we admit the idea that rock-salt is formed from the waters of the sea, makes it necessary to suppose the occurrence on this spot of the most vast and wonderful changes. M. Hassenfratz states it as a general fact, that in countries where salt-mines occur, fragments of primitive rocks appear in great abundance over these beds. It does not seem, however, that any deduction of importance can be connected with this fact.

The disposition of the beds of salt in the continental mines seems to be very generally a horizontal one, and as in the English mines, they are separated by strata of clay of a varying thickness. It would appear, however, with respect to extent of dimensions, that they are in general greatly inferior to the bodies of rock-salt met with in our own island. In Hungary and Poland these beds do not present a thickness of more than one or two feet, and are separated by layers of clay a few inches in thickness. Much, however, it is evident, must depend upon the number of the beds thus disposed; but this I do not find any where noticed. The earthy saline contents of the foreign rock-salt very exactly resemble those of the Cheshire; the gypsum existing in much larger proportion than the other earthy salts, and appearing in considerable masses, both distinctly, and in mixture with the beds of clay. It is an important fact, however, that sea-shells and other marine exuviæ are found in these beds of clay and gypsum; a circumstance which never occurs in the Cheshire mines. It would seem that the portion of oxyd of iron combined with the clay in the substance of the English rock-salt does not exist in the mineral as found abroad, or at least in a proportion not so considerable.

The comparative commercial value of the English and Polish mines is best ascertained by the fact that many thousand tons of rock-salt are annually sent from Cheshire to the parts of the Prussian coast most nearly adjacent to the salt-mines; independently of the large supplies of the English manufactured white salt which are exported to the same country.

With respect to the theory of the formation of rock-salt, it must be acknowledged that though there are some difficulties connected with the supposition, little doubt can exist of the general fact, that the beds of this mineral have been formed by deposition from the waters of the sea. Such an opinion acquires much probability from the situation in which these beds usually occur; occupying the valleys and lower parts of plains which are so surrounded by hills of secondary formation, as to leave only a narrow egress for the waters collected on their surface. This structure of the plain constituting the salt district of Cheshire, regarded in its general character, leads strongly to the conclusion that the waters of the sea must, at some former period, have occupied the lower parts at least of the basin thus formed, which at that time had a level eighty or one hundred yards lower than the one now appearing. To account for the great depositions of salt in the lower parts of this basin, it is necessary to suppose that some barrier must have been afterwards interposed to prevent the free communication of the waters of the sea with those thus collected; and the general course of the streams, the position of the beds of rock-salt, and the contractions in the valley of the Weaver, which appear below Northwich at Anderton and Frodsham, point out with some distinctness the place where these obstructions may probably have occurred.

To explain the appearance of the strata of indurated clay, intermediate between the beds of salt, we must suppose that the obstruction still continued, when the deposition of salt from the waters first confined had nearly ceased; and that at this period the deposition of clay, which had hitherto been going on in conjunction with that of the salt, proceeded in a great measure alone; the salt which remained in the water being merely sufficient to form small veins in its substance. When these strata had been deposited to a thickness of ten or eleven yards, it would appear that the barrier preventing the access of the sea to the basin or plain was again so far removed as to allow the entrance of a fresh body of sea water; from the gradual evaporation of which, the formation of the upper bed of rock-salt took place; and there being then no further admission of sea water to the plain, the superincumbent strata of clay and marl were successively deposited in the order in which they at present appear.

This is a general sketch of the probable mode of formation of the Cheshire rock-salt; but as it would seem very doubtful whether any single accumulation of sea water could contain the materials of depositions possessing so great a thickness, the theory might perhaps be successfully modified, by supposing the barrier before noticed to have had such an elevation in the progressive stages of the deposition of the salt, as to allow the very frequent ingress of sea water into the basin. Admitting this idea, we must suppose that the formation of the strata of indurated clay between the beds of rock-salt took place, either during some intermission of these overflowings, or when there was a great predominance of this earth in the water from which the depositions were made. It seems probable too that the veins of salt intersecting these strata were formed rather by the penetration of water holding salt in solution, from the upper bed of rock-salt, than by a direct deposition from the waters of the sea. With respect to the sources of the clay, combined with the substance of the rock-salt, or found in intermediate and superincumbent beds, little doubt can exist that it has been derived from the decomposition of more ancient rocks, of the situation and

precise characters of which no vestiges now remain.

This general idea of the formation of the Cheshire rock-salt derives confirmation from the fact that, with the exception of the sulphat of magnesia, the same earthy salts occur together with the muriat of soda in these strata, as are met with in the waters of the sea. The circumstance of the beds decreasing in thickness as they recede from the sea, may perhaps be admitted as another argument in behalf of the opinion.

The principal objection to the theory undoubtedly is, the non-existence of marine exuviæ either in the rock-salt or in the adjacent strata of clay; a fact very difficult to connect with the idea of a deposition from the waters of the sea. Other objections, though perhaps of less moment, arise from the appearance of the earthy salts in smaller proportion in the rock-salt than in sea water; from the apparently partial deposition of the beds, and from the difficulty of explaining the formation of the figured appearances which occur in the substance of the rock. These circumstances, however, will by no means authorize us to reject the general idea which has been given of the origin of this mineral, strengthened as it is by the situation and appearances observed in the foreign salt mines, where the proofs of marine deposition are still stronger than those presented in the Cheshire district.

Section of the Strata sunk through to the second Bed of Rock-Salt at Witton, near Northwich.

No.	Nature of the Strata.	yards.	feet.	inch.
1	Calcareous marl	5	—	—
2	Indurated red clay	1	1	6
3	Indurated blue clay with sand	2	1	—
4	Argillaceous marl	1	2	—
5	Indurated blue clay	—	1	—
6	Red clay, with sulphat of lime irregularly intersecting it	1	1	—
7	Indurated blue and brown clay, with grains of sulphat of lime interspersed	1	1	—
8	Indurated brown clay, with sulphat of lime crystallized in irregular masses, and in large proportion	4	—	—
9	Indurated blue clay, laminated with sulphat of lime	1	1	6
10	Argillaceous marl	1	1	—
11	Indurated brown clay, laminated with sulphat of lime	1	—	—
12	Indurated blue clay, with laminæ of sulphat of lime	1	—	—
13	Indurated red and blue clay	4	—	—
14	Indurated brown clay, with sand and sulphat of lime irregularly interspersed through it. The fresh water (360 gallons per minute) finds its way through holes in this stratum, and has its level at sixteen yards from the surface	4	1	—
15	Argillaceous marl	1	2	—
16	Indurated blue clay with sand, and grains of sulphat of lime	1	—	9
17	Indurated brown clay, with a little sulphat of lime	5	—	—
18	Indurated blue clay, with grains of sulphat of lime	—	1	6
19	Indurated brown clay, with sulphat of lime	2	1	—
20	The first bed of rock-salt	25	—	—
21	Layers of indurated clay, with veins of rock-salt running through them	10	1	6
		76	2	9
22	The second bed of rock-salt, which has been sunk into 35 or 36 yards.			

RO'CKER, *s.* (from *rock.*) One who rocks the cradle (*Dryden*).

ROCKET, in pyrotechny, an artificial firework, usually consisting of a cylindrical case of paper, filled with a composition of certain combustible ingredients; which being tied to a rod, mounts into the air to a considerable height, and there bursts. These are called sky rockets. Beside which, there are others called water rockets, from their acting in water.

The composition with which rockets are filled consists of the three following ingredients, viz. saltpetre, charcoal, and sulphur, all well ground; and in the smaller sizes, gunpowder dust is also added. But the proportions of all the ingredients vary with the weight of the rocket, as in the following table.

Compositions for rockets of various sizes.

The general composition for rockets is,

Saltpetre 4 lb.
Sulphur 1 lb.
Charcoal 1 lb.

But for large rockets,

Saltpetre 4 lb.
Sulphur 1 lb.
Mealpowder 1 lb.

For rockets of a middle size,

Saltpetre 3 lb.
Sulphur 2 lb.
Mealpowder 1 lb.
Charcoal 1 lb.

When rockets are intended to mount upwards, they have a long slender rod fixed to the lower end, to direct their motion.

Rockets have often been employed to throw among an enemy's army, by firing them at oblique angles. In this way they have been used by the Indians for many ages; and they have recently been introduced into the English service by Mr. Hume and colonel Congreve.

Theory of the flight of rockets.—Mariotte takes the rise of rockets to be owing to the impulse or resistance of the air against the flame. Desaguliers accounts for it thus.

Conceive the rocket to have no vent at the choke, and to be set on fire in the conical bore; the consequence would be, either that the rocket would burst in the weakest place, or that, if all parts were equally strong, and able to sustain the impulse of the flame, the rocket would burn out immoveable. Now, as the force of the flame is equable, suppose its action downwards, or that upwards, sufficient to lift 40 pounds; as these forces are equal, but their directions contrary, they will destroy each other's action.

Imagine then the rocket opened at the choke; by this means the action of the flame downwards is taken away, and there remains a force equal to 40 pounds acting upwards, to carry up the rocket, and the stick or rod it is tied to. Accordingly we find that if the composition of the rocket be very weak, so as not to give an impulse greater than the weight of the rocket and stick, it does not rise at all; or if the composition be slow, so that a small part of it only kindles at first, the rocket will not rise.

The stick serves to keep it perpendicular; for if the rocket should begin to tumble, moving round a point in the choke, as being the common centre of gravity of rocket and stick, there would be so much friction against the air, by the stick between the centre and the point, and the point would beat against the air with so much velocity, that the reaction of the medium would restore it to its perpendicularity. When the composition is burnt out, and the impulse upwards has ceased, the common centre of gravity is brought lower towards the middle of the stick; by which means the velocity of the point of the stick is decreased, and that of the point of the rocket is increased; so that the whole will tumble down, with the rocket end foremost.

All the while the rocket burns, the common centre of gravity is shifting and getting downwards, and still the faster and the lower as the stick is lighter; so that it sometimes begins to tumble before it is quite burnt out: but when the stick is too heavy, the common centre of gravity will not get so low, but that the rocket will rise straight, though not so fast.

From the experiments of Mr. Robins, and other gentlemen, it appears that the rockets of 2, 3, or 4 inches diameter, rise the highest; and they found them rise to all heights in the air, from 400 to 1254 yards, which is about three quarters of a mile. See Robins's Tracts, vol. 2, p. 317; and the Philos. Trans. vol. 46, p. 578.

The theory of rockets, however, is still in a very imperfect state. Mr. Moore of the Royal Military Academy, Woolwich, has published some essays on the subject in Nicholson's Journal; but we still need a complete treatise on this interesting and rather abstruse subject.

ROCKET, in botany. See BRASSICA.

ROCKET (Dame's violet, or Gilliflower), in botany. See HESPERIS.

ROCKET (Bastard), in botany. See RESEDA.

ROCKET (Night smelling), in botany. See HESPERIS.

ROCKINGHAM, a town in Northamptonshire, in England, 87 miles from London, stands on the river Welland. It has a charity-school, a market on Thursday, and a fair on Sept. 8, for five days. Its forest was reckoned one of the largest and richest of the kingdom, in which William the Conqueror built a castle; it extended, in the time of the ancient Britons, almost from the Welland to the Nen, and was noted formerly for iron-works, great quantities of flags, i. e. the refuse of the iron-ore, being met with in the adjacent fields. It extended, according to a survey in 1641, near 14 miles in length, from the west of Middleton-woods to the town of Wansford, and five miles in breadth, from Brigstock to the Welland; but is now dismembered into parcels, by the interposition of fields and towns, and is divided into three bailiwics. In several of its woods a great quantity of charcoal is made of the tops of trees, of which many waggon-loads are sent every year to Peterborough. There is a spacious plain in it called Rockinghamshire, which is a common to the four towns of Cottingham, Rockingham, Corby, and Gretton. King William Rufus called the council here of the great men of the kingdom. Lon. 0. 46 W. Lat. 52. 32 N.

ROCKLESS. *a.* Without rocks.

ROCKLING, in ichthyology. See GADUS.

ROCKOMBOLE. See ALLIUM.

RO'CKWORK. *s.* (*rock* and *work*.) Stones fixed in mortar, in imitation of the asperities of rocks (*Addison*).

RO'CKY. *a.* (from *rock*.) 1. Full of rocks (*Sandys*). 2. Resembling a rock (*Milton*). 3. Hard; stony; obdurate (*Shakspeare*).

ROD. *s.* (*roede*, Dutch.) 1. A long twig (*Boyle*). 2. A kind of sceptre (*Shakspeare*). 3. Any thing long and slender (*Glanville*). 4. An instrument for measuring (*Arbuthnot*). 5. An instrument of correction, made of twigs tied together (*Spenser*).

ROD, or POLE, in land measuring, a lineal measure of $16\frac{1}{2}$ feet.

ROD (Aaron's). See SOLIDAGO.

ROD (Golden). See SOLIDAGO.

ROD TREE (Golden). See BOSEA.

ROD (Black). See GENTLEMAN.

ROD (Fishing). See ANGLING and FISHING.

RODE. The preterit of *ride*.

RODNEY (George Brydges, lord), an English admiral, born about 1718. He was in 1759 employed as admiral, to bombard Havre

de Grace. In 1761, he was sent against Martinico, and for his services was made knight of the bath. A disputed election at Northampton rendered his pecuniary resources very scanty, and he fled to France to escape his creditors. Very liberal offers were made to him by the French court, to enter into their service, which he rejected with becoming indignation. This conduct was honourably mentioned by Sartine the French minister to the English government; and Rodney, at the invitation of lord Sandwich, returned to serve his country. He was placed at the head of a fleet, and in 1780 captured a Spanish convoy near Cadiz, and a few weeks after defeated the squadron of Langara, by the capture of five ships of the line. In 1781, he took St. Eustathius from the Dutch, and on the 12th of April 1782, he obtained a complete triumph over de Grasse's fleet in the West Indies, by the sinking of one ship, and the capture of five others. For these services he was raised to the peerage, and had a pension of 2000l. a year settled upon him. He died 1792.

RODOMONTA'DE. *s.* (from a boastful hero of Ariosto, called *Rodomonte*.) An empty noisy bluster or boast; a rant (*Dryden*).

To RODOMONTA'DE. *v. n.* (from the noun.) To brag thrasonically; to brag like Rodomonte.

RODOSTO, a seaport of European Turkey, in Romania, and a Greek bishop's see. It is seated on the side of a hill, on the sea of Marmora, 62 miles W. of Constantinople. Lon. 27. 37 E. Lat. 41. 1 N.

RODRIGUEZ, an island in the Indian ocean, lying 100 leagues E. of Mauritius, and possessed by the French. It is 30 miles long and 12 broad; the country mountainous, and in many parts rocky, though there are others in which the soil is excellent; but the best production of the island is the land turtle, which are in great abundance. On the N. side is a bay that affords secure shelter for ships, and ample supplies of wood and water. Lon. 63. 0 E. Lat. 19. 30 S.

ROE, in zoology. See CERVUS.

ROE, the seed or spawn of fish. See SPAWN.

ROE (Sir Thomas), an eminent statesman, born at Low Layton, Essex, 1580. He resided for about two years at Magdalen college, Oxford, and then studied at the inns of court. He was knighted by James 1604, and 1614 went as ambassador to the court of the Great Mogul. In 1621, he was ambassador to the Grand Signior, till 1628. During his residence abroad, not only the commercial interests of his country were his great concern, but also literature, and he made a valuable collection of MSS. which he presented to the Bodleian library. He brought also as a present from Cyril, patriarch of Constantinople, to Charles I. the famous Alexandrian MS. of the New Testament, and some other MSS. which are deposited in the Bodleian library. He died in 1644.

ROELLA, in botany, a genus of the class pentandria, order monogynia. Corol funnel-form, closed at the bottom by valves bearing the stamens; stigma two-cleft; capsule two-celled, cylindrical, inferior. Five species—four shrubby plants of the Cape; one of Ethiopia.

ROEMER (Olaus), a Danish astronomer and mathematician, born in 1644, and educated at the university of Copenhagen. His fame having reached France, he was invited thither, and received from Louis XIV. a pension for teaching the dauphin mathematics. In 1681 Christian V. king of Denmark called him back to his own country, and made him professor of astronomy at Copenhagen. He died in 1710. He is principally celebrated for having discovered, by means of the eclipses of Jupiter's satellites, that light moves with finite velocity, and for having determined nearly what that velocity is.

ROER, a river of Germany, which rises in the duchy of Westphalia, flows by Arensberg, Schwerte, Werden, and Duysburg, and enters the Rhine at Roerort.

ROER, a new department of France, including the duchy of Juliers, and part of the territories of Cleve, Gelders, and Cologne. It takes its name from a river, which rises above Juliers, and joins the Meuse at Ruremonde. The capital is Aix-la-Chapelle.

ROGA, in antiquity, a present made by the emperors to the senators, magistrates, and even to the people; and by the popes and patriarchs to their clergy. These rogæ were distributed by the emperors on the first day of the year, on their birth-day, or on the *natalis dies* of the cities; and by the popes and patriarchs in passion-week. Roga is also used for the common pay of the soldiers.

ROGATION (*rogatio*), in the Roman jurisprudence, a demand made by the consuls or tribunes of the Roman people, when a law was proposed to be passed. Rogatio is also used for the decree itself made in consequence of the people's giving their assent to this demand; to distinguish it from a *senatus consultum*, or decree of the senate.

ROGATION-WEEK, the week immediately succeeding Whitsunday; so called from the three feasts therein, viz. on Monday, Tuesday, and Wednesday.

ROGER I. king of Sicily, born in 1097, was the grandson of Hauteville of Normandy. He continued to extend his territories in spite of the pope, who endeavoured to stop his career by troops and excommunications. He espoused the cause of Anacletus the anti-pope, and took Innocent II. prisoner with all his suite, releasing him only upon condition of being acknowledged in all his newly acquired dominions. He died in 1154.

ROGER (of Hexham), was brought up in the convent of Hexham, in Northumberland, and was elected prior of it about 1138. He wrote a history of the campaign of the Scottish army under their king David, when the battle of the standard was fought.

ROGERS (Woods), an English navigator,

known for his expedition against the Spanish settlements in the South seas, in a ship of war from Bristol. He returned 1711, after surrounding the globe, and published an account of his voyage. He died 1732. His works have appeared in French, 3 vols. 12mo.

Rogers (John), a divine, educated at Cambridge. He was chaplain to the English factory at Antwerp, and on the succession of Edward VI. he returned, and obtained a prebend of St. Paul's. In Mary's reign, he was the first who suffered martyrdom at the stake in Smithfield, 1555. He had assisted Coverdale and Tindal in translating the bible into English.

Rogers (John), a divine, born 1679, at Ensham, Oxfordshire. He was educated at New college school, and Corpus Christi, and in 1712 went to London as lecturer of St. Clement Danes. He obtained in 1716, the rectory of Wrington, Somersetshire, and engaged in 1719, in the Bangorian controversy, and acquired on that occasion so much credit by his discourse on the visible and invisible church of Christ, that the university of Oxford conferred upon him the degree of D. D. in 1721. He obtained a canonry, and the office of subdean, in the cathedral of Wells, and in 1728 was promoted to the living of St. Giles's, Cripplegate, London. He died 1729. After his death were published 4 vols. of his sermons —a persuasive to conformity, addressed to dissenters, &c. He wrote besides, a defence of Christianity against Collins' scheme of literal prophecy, &c.

ROGERWICK, or Port Baltic, a seaport of Russia, in the province of Revel, seated on a fine bay at the entrance of the gulf of Finland, 40 miles W.N.W. of Revel. Lon. 23. 20 E. Lat. 59. 10 N.

ROGUE. *s.* (of uncertain etymology.) 1. A wandering beggar; a vagrant; a vagabond (*Bacon*). 2. A knave; a dishonest fellow; a villain; a thief (*South*). 3. A name of slight tenderness and endearment (*Shakspeare*). 4. A wag (*Shakspeare*).

To Rogue. *v. n.* (from the noun.) 1. To wander; to play the vagabond (*Carew*). 2. To play knavish tricks.

RO'GUERY. *s.* (from *rogue.*) 1. The life of a vagabond (*Donne*). 2. Knavish tricks (*Shakspeare*). 3. Waggery; arch tricks.

RO'GUESHIP. *s.* (from *rogue.*) The qualities or personage of a rogue (*Dryden*).

RO'GUISH. *a.* (from *rogue.*) 1. Vagrant; vagabond (*Spenser*). 2. Knavish; fraudulent (*Swift*). 3. Waggish; wanton; slightly mischievous (*Addison*).

RO'GUISHLY. *ad.* (from *roguish.*) Like a rogue; knavishly; wantonly.

RO'GUISHNESS. *s.* (from *roguish.*) The qualities of a rogue.

RO'GUY. *a.* (from *rogue.*) Knavish; wanton. A bad word (*L'Estrange*).

ROHACZOW, a town of Lithuania, in the palatinate of Minsk, seated on the Dnieper, near the influx of the Ordrwa, 100 miles S.E. of Minsk. Lon. 30. 20 E. Lat. 53. 2 N.

ROHAN, a town of France, in the department of Morbihan, seated on the Aoust, 20 miles N. of Vannes.

Rohan (Henry, duke of), a peer of France, born 1579. He gained the friendship of Henry IV. by his bravery at the siege of Amiens, and distinguished himself at the head of the Huguenots, for whom he obtained a very advantageous peace with Lewis XIII. After being in the service of Venice, he was recalled by Lewis XIII. and employed in negociation as well as in war, but the jealousy of Richelieu drove him to Geneva. He joined his friend the duke of Saxe Weimar against the imperialists, and was fatally wounded in battle, and died six weeks after, 1638. His memoirs of the political affairs of France, &c. from 1610 to 1629, in 2 vols. 12mo. are much admired. He wrote besides the interest of princes, printed Cologne, 1666, 12mo.—on the government of the 13 cantons—an abridgment of Cæsar's commentaries, &c.

ROHAULT (James), an able French philosopher, was the son of a merchant at Amiens, where he was born in 1620. He became well skilled in the mathematical sciences of that time, and taught them at Paris; pursuing them chiefly as introductory to the study of philosophy. He seems to have been a great lover of truth, at least what he thought so, and to have sought it with much impartiality. He read the ancient and modern philosophers; but Des Cartes was the author who most engaged his notice. Accordingly he became a zealous follower of that great man, and drew up an abridgment and explanation of his philosophy with great clearness and method. In the preface to his Physics, for so his work is called, he makes no scruple to say, that the abilities and accomplishments of this philosopher must oblige the whole world to confess, that France is at least as capable of producing and raising men versed in all arts and branches of knowledge, as ancient Greece. Clerselier, well known for his translation of many pieces of Des Cartes, conceived such an affection for Rohault, on account of his attachment to this philosopher, that he gave him his daughter in marriage, against all the remonstrances of his family.

Rohault's Physics were written in French, but have been translated into Latin by Dr. Samuel Clarke, with notes, in which the Cartesian errors are corrected upon the Newtonian system. The fourth and best edition of Rohault's Physica, by Clarke, is that of 1718, in 8vo. He wrote also, Elemens de Mathematiques, Traité de Mechanique, and Entretiens sur la Philosophie.

But these dialogues are founded and carried on upon the principles of the Cartesian philosophy, which has now little other merit than that of having corrected the errors of the ancients. Rohault died in 1675, and left behind him the character of an amiable, as well as a learned and philosophic man.

His posthumous works were collected and printed in two neat little volumes, first at

Paris, and then at the Hague in 1690. The contents of them are, 1. The first 6 books of Euclid. 2. Trigonometry. 3. Practical Geometry. 4. Fortification. 5. Mechanics. 6. Perspective. 7. Spherical Trigonometry. 8. Arithmetic.

ROHILCUND, or ROHILLA, a territory of Hindustan Proper, whose inhabitants are called Rohillas. It lies to the E. of Delhi, and is subject to the nabob of Oude, by whom, with the assistance of the British, it was conquered in 1774. Bereilly is the capital.

ROHRIA, in botany, a genus of the class triandria, order monogynia. Calyx campanulate, five-parted; corol five-petalled, unequal; stigmas three, revolute; capsule undecided. One species; a branched shrub of Guiana, with flowers in small clustered racemes.

To ROIST. *To* ROI'STER. *v. n.* (*rister*, Islandic, a violent man.) To behave turbulently; to act at discretion; to be at free quarter; to bluster (*Shakspeare*).

ROI'STER, or *Roisterer. s.* (from the verb.) A turbulent, brutal, lawless, blustering fellow.

ROLANDRA, in botany, a genus of the class syngenesia, order polygamia segregata. Florets fascicled in a head, mixed with intervening scales, all hermaphrodite; calycle two-valved, one-flowered; seeds crowned with a toothed margin. One species; a West Indian shrub.

To ROLL. *v.a.* (*rouler*, Fr. *rollen*, Dutch.) 1. To move any thing by volutation, or successive application of the different parts of surface, to the ground (*Mark*). 2. To move any thing round upon its axis. 3. To move in a circle (*Milton*). 4. To produce a periodical revolution (*Milton*). 5. To wrap round upon itself. 6. To enwrap; to involve in bandage (*Wiseman*). 7. To form by rolling into round masses (*Peacham*). 8. To pour in a stream of waves (*Pope*).

To ROLL. *v. n.* 1. To be moved by the successive application of all parts of the surface to a plane: as a cylinder (*Dryden*). 2. To run on wheels (*Dryden*). 3. To perform a periodical revolution (*Dryden*). 4. To move with the surface variously directed (*Milton*). 5. To float in rough water (*Pope*). 6. To move as waves or volumes of water (*Temple*). 7. To fluctuate; to move tumultuously (*Pope*). 8. To revolve on an axis (*Sandys*). 9. To be moved with violence (*Milton*).

ROLL. *s.* (from the verb.) 1. The act of rolling; the state of being rolled. 2. The thing rolling (*Thomson*). 3. (*rouleau*, Fr.) Mass made round (*Addison*). 4. Writing rolled upon itself (*Prior*). 5. A round body rolled along; a cylinder (*Mortimer*). 6. (*rotulus*, Lat.) Public writing (*Hale*). 7. A register; a catalogue (*Davies*). 8. Chronicle (*Dryden*). 9. (*rolé*, Fr.) Part; office: not in use (*L'Estrange*).

ROLL, in manufactories, something wound and folded up in a cylindrical form.

Few stuffs are made up in rolls, except sattins, gawses, and crapes, which are apt to break, and take plaits not easy to be got out, if folded otherwise. Ribbons, laces, galloons, and paduas of all kinds, are also thus rolled.

A roll of tobacco is tobacco in the leaf, twisted on the mill, and wound twist over twist, about a stick or roller. A great deal of tobacco is sold in America in rolls of various weights; and it is not till its arrival in England, Spain, France, and Holland, that it is cut. A roll of parchment properly denotes the quantity of sixty skins.

The ancients made all their books up in the form of rolls, and in Cicero's time the libraries consisted wholly of such rolls.

ROLL, in law, signifies a schedule or parchment which may be rolled up by the hand into the form of a pipe.

In these schedules of parchment all the pleadings, memorials, and acts of court, are entered and filed by the proper officer; which being done, they become records of the court. Of these there are in the exchequer several kinds, as the great wardrobe-roll, the cofferer's-roll, the subsidy-roll, &c.

Roll is also used for a list of the names of persons of the same condition, or of those who have entered into the same engagement. Thus a court-roll of a manor is that in which the names, rents, and services of each tenant are copied and inrolled.

ROLL (Muster), that in which are entered the soldiers of every troop, company, regiment, &c.

As soon as a soldier's name is written down on the roll, it is death for him to desert.

ROLLS-OFFICE, is an office in Chancery-lane, London, appointed for the custody of the rolls and records in chancery.

ROLLS OF PARLIAMENT, are the manuscript registers, or rolls of the proceedings of our ancient parliaments, which before the invention of printing were all engrossed on parchment, and proclaimed openly in every county. In these rolls are also contained a great many decisions of difficult points of law, which were frequently in former times referred to the decision of that high court.

ROLL, or ROLLER, is also a piece of wood, iron, brass, &c. of a cylindrical form, used in the construction of several machines, and in several works and manufactures.

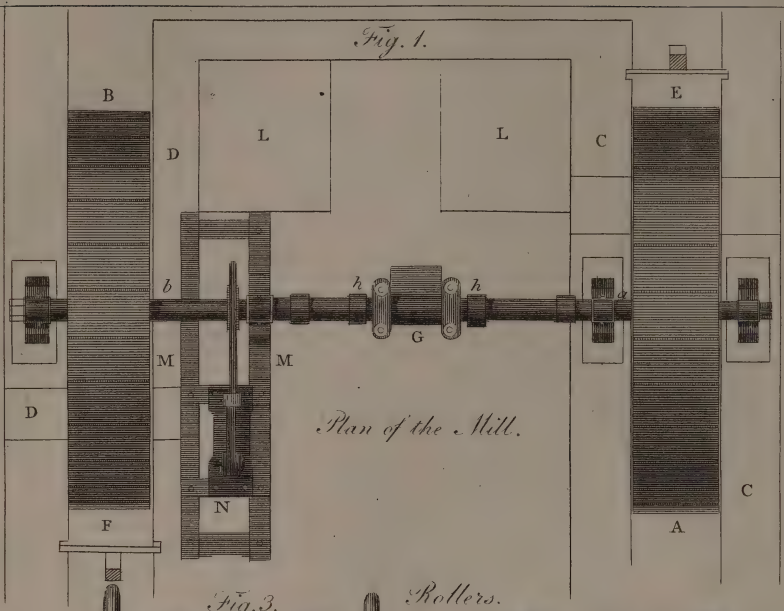
ROLLED BACK, in botany. See REVOLUTE.

ROLLER, in surgery, a long and narrow bandage, usually of linen-cloth, rolled round any part of the body, to keep it in, or dispose it to a state of health.

ROLLER, in ornithology. See CORACIAS.

ROLLIN (Charles), a celebrated French writer, was born at Paris in 1661. After studying in the college of Plessis, he became rector of the university, and professor of eloquence, and member of the academy of Inscriptions, but having sided with the Jansenists against the Jesuits, he was removed from his offices. He wrote the Roman History down to about 70 years short of the battle of Actium, the Ancient History of the Egyptians, Cartha-

Fig. 1.



Plan of the Mill.

Rollers.

Fig. 3.

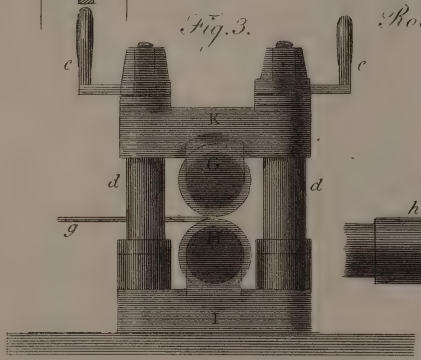
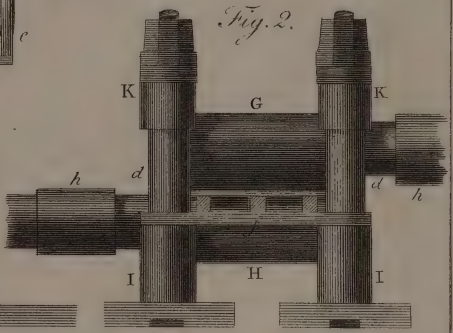
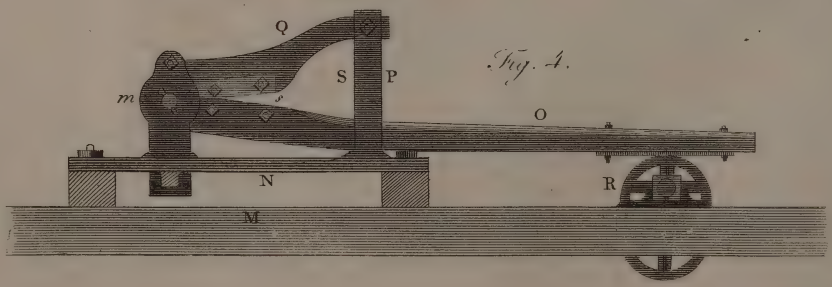


Fig. 2.



Elevation of the Shears.

Fig. 4.



J. Farey, Junr. delt.

Mudlow Sc. Rupell Ct.

London, Published by Sherwood & Co. Paternoster Row, Aug. 1st 1822

ginians, Babylonians, &c. in 8 vols. 8vo. as also a Treatise upon the manner of studying and teaching the Belles Lettres. This excellent man died in 1741.

ROLLING. A word applied to that rapid pulsation of the drum by which the sounds so closely succeed each other, as to beat upon the ear with a rumbling continuity of effect.

Rolling, the motion by which a ship rocks from side to side like a cradle, occasioned by the agitation of the waves. Rolling, therefore, is a sort of revolution about an imaginary axis passing through the centre of gravity of a ship: so that the nearer the centre of gravity is to the keel, the more violent will be the rolling motion; because the centre about which the vibrations are made is placed so low in the bottom, that the resistance made by the keel to the volume of water which it displaces in rolling, bears very little proportion to the force of the vibration above the centre of gravity, the radius of which extends as high as the mast-heads. But if the centre of gravity is placed higher above the keel, the radius of vibration will not only be diminished, but an additional force to oppose the motion of rolling will be communicated to that part of the ship's bottom which is below the centre of gravity. So far as relates to the effect of rolling, when produced by the quality or stowage of the ballast, and to the manner by which it may be prevented, viz. a change of the quantity or disposition of the ballast, we shall endeavour to explain under the article Trim. It may, however, be necessary to remark that the construction of the ship's bottom may also contribute to diminish this movement considerably. Many fatal disasters have happened to ships arising from a violent rolling; as the loss of the masts, loosening of the cannon, and straining violently on the decks and sides, so as to weaken the ship to a great degree.

Rolling mill, in mechanics, a machine employed to laminate or flatten metals to a uniform thickness, by passing between iron rollers fixed in a strong frame, and turned round by the power of a water mill. This machine is very generally employed for making iron bars and plates, for rolling brass and copper plates: and the reduction of gold and silver to the proper thicknesses for the artificer, is almost exclusively performed by rolling; as this method makes no waste, is the most expeditious, and produces better work than any other method of reducing, particularly where an even surface is an object; such, for example, as in gold or silver which is always to be polished.

Plate 150 is a representation of a rolling mill, such as is used in the iron works, for reducing irregular masses of iron into thin flat plates, or parallel bars for hoops, &c. and other purposes which have been detailed under the article Iron manufacture. Fig. 1 is a plan of the mill, figs. 2 and 3 are separate views of the rollers, and fig. 4 is a detached view of the shears for cutting off the ends of iron bars. AB, fig. 1, are the two water wheels, having iron axes *ab* which are supported on bearings which lie upon the walls CC and DD, enclosing the wheels, and confining the water to act upon its float boards. E and F are the shuttles which admit the water to the wheels; the water wheels (which are undershot) turn in contrary directions to each other. The wheel B is connected with the lowest of the two rollers at G, and A turns the upper roller. These rollers are seen in figs. 2 and 3, where G is the upper and H the lower roller. Their gudgeons turn on brasses which are fitted into strong pieces of iron II, KK, having holes through their ends to receive four strong iron bolts *dd*, which form the frame to retain the rollers at the proper distance. The upper ends of these bolts are cut with screws, upon which nuts are fitted, and these being turned round by their handles *ee*, screw down the pieces KK, and advance the rollers nearer together; or by a contrary motion increase the distance between them: *f*, fig. 2, is a strong iron bar extended from one bolt *d* to the other; it supports an iron plate, fig. 3, forming a kind of table before the rollers to guide the iron through them. The rollers have square heads upon the ends of their gudgeons, upon which squares large cast iron sockets *h* are fitted; and these at the other ends are fitted on similar squares upon the ends of the water wheel axis *ab*. A little play or looseness is admitted in all these squares, because the upper roller being set at different heights, according to the work which is to be rolled between them, this play is required to allow the rollers to move when they are not exactly in the line of the water wheel's axis. At LL in fig. 1 are the furnaces for heating the iron to be rolled; they are a kind of oven into which the iron is introduced, and remains till heated to a white heat; it is then taken out by a pair of pincers and presented to the rollers, (the water wheels being previously set in motion by drawing their shuttles). The rollers draw in the metal, and as they cannot recede from each other because of the nuts of the bolts *dd*, the metal is reduced to the exact thickness of space between them, increasing in length but not at all in breadth. The iron is caught by another workman in front of the rollers, and returned over the top roller to the first man who puts it through again, first giving the handles *ee* of the nuts a small turn to bring the rolls nearer together. In this manner it is repeatedly rolled, till it is reduced to any required length and thickness; but the breadth is not at all increased by rolling; and if it is required to increase the breadth it is done by putting the iron obliquely through the rollers, or if a great increase is wanted the iron is put through breadthwise.

Iron plate is rolled out from short pieces of iron bar, which are cut from the bars by a pair of shears, fig. 4 and fig. 1. MM are two strong beams bedded on the walls, and having two cross beams on which an iron plate N is bolted. This plate, see fig. 4, has a piece *m* fixed to it, which is the joint of the shears. The upper blade Q is supported at the end in an upright P, having a groove through it to receive the lower blade O, which is a long lever, and its

end rests upon the circumference of an elliptical wheel R fixed on the axis of the water-wheel B, which as it revolves lifts up the lever closing the shears, and cutting any iron bar which is put in between them. The blades consist of plates of steel *s* screwed to the cast-iron arms. The workman puts the end of the bar into the opening S, and when the shears open, he introduces it between the blades; as the mill closes them, they cut at once through the bar, though some are as much as 3 inches wide and 1 inch thick.

RO'LLINGPIN. *s.* (*rolling* and *pin.*) A round piece of wood tapering at each end, with which paste is moulded (*Wiseman*).

RO'LLING-PRESS. *s.* A cylinder rolling upon another cylinder, by which engravers print their plates upon paper. See PRINTING.

ROLLO (John), M. D. was born at Dundee, in North Britain, in the year 1755. Devoting himself to the medical profession, he studied first in the neighbourhood of his native place, and afterwards at Edinburgh. Early in life he was appointed an ordnance surgeon, and in consequence went abroad with the army, and continued several years in the West Indies. On his return to England about 1790, he commenced private practice as a surgeon at Woolwich. But in the year 1793 he was appointed a surgeon to the Royal Horse Artillery: and in March 1794, on the death of Dr. Urwin (his son, the present surgeon-general, being abroad,) he was promoted to the rank of surgeon-general of the Royal Artillery. The duties of this important employment he discharged with great honour to himself, with singular benefit to the junior and assistant surgeons, and with a feeling and skilful regard to the sick and wounded soldiery, till within two or three years of his death, when personal infirmities and domestic afflictions incapacitated him for active exertion. He died at Woolwich, in December 1809, after a lingering indisposition, and was buried at the neighbouring village of Plumstead.

Dr. Rollo, during the most active part of his life, was much distinguished for his professional talents. He published two respectable works. The first entitled An Account of the Artillery Hospital at Woolwich. The second, Cases of the Diabetes Mellitus, in an 8vo vol. This is a very interesting work, in which the author proposes a new theory of that lamentable disorder, and deduces from it a new mode of treatment, which has been often adopted with success; and which, indeed, though the theory has by no means so many advocates as it had a few years ago, has led to an entire change in the manner of treating the malady. See DIABETES.

RO'LLYPOOLY. *s.* A sort of game, in which, when a ball rolls into a certain place, it wins (*Arbuthnot*).

RO'MAGE. *s.* (*ramage*, Fr.) A tumult; a bustle; an active and tumultuous search for any thing (*Shakspeare*).

ROM, an island of Denmark, on the E. coast of S. Jutland. It is seven miles long and nearly three broad, and contains a few villages.

ROMAGNA, a province of Italy, bounded on the N. by the Ferrarese, E. by the gulf of Venice, S. by Tuscany and Urbino, and W. by the Bolognese and Tuscany. It is fertile in corn, wine, oil, and fruits; and has also mines, mineral waters, and salt-works, which make its principal revenue. This province lately belonged to the Ecclesiastical State, but is now a part of the new-formed kingdom of Italy. Ravenna is the capital.

ROMAINMOTIER, a town of Swisserland, in the Pays de Vaud, capital of a bailiwic, with a castle; seated in a narrow valley, through which flows the river Diaz, 11 miles S.W. of Yverdun.

ROMAN, in general, something belonging to the city of Rome. See ROME.

ROMANS (King of the), in modern history, is a prince elected to be successor to the reigning emperor of Germany.

ROMAN CATHOLICS. See PAPISTS.

ROMAN ALUM. See ALUMEN.

ROMANCE, in literature, a fabulous relation of certain adventures designed for the entertainment and instruction of the readers, and differing from the novel as it always exhibits actions great, dangerous, and generally extravagant. Many authors of the first name have written on the ancient romance. It has exercised the pen of Hurd, of Warburton, and of some ladies, who have not thought it any derogation to the sensibility of their sex to unite antiquarian research with the cultivation of the belles lettres. We have not, however, seen any where so concise, just, and elegant an account of the origin and progress of romances as in D'Israeli's Curiosities of Literature. "Romance (says this writer) has been elegantly defined the offspring of fiction and love. Men of learning have amused themselves with tracing the epocha of romances. In this research they have displayed more ingenuity than judgment; and some have fancied that it may have existed as far back as the time of Aristotle; Dearchus, one of his disciples, having written several works of this amusing species.

"But romance was in fact the current name for all those popular dialects of Europe which were formed from the Roman, which itself retained the name of Latin; and a romance was originally nothing more than a history or poem in the popular language. Mary, the Norman poetess, when she translates any thing into the language of her country, says always, such a work *en Romans*. Thus, in a version of Cato's Distichs, she says:

"Seignor ains Re je vous commans
Espondre Caton *en Romans*."

Also, in her translation of Æsop's Fables:

"Au finement de cest escrit
Quen Romans ai fine et dit."

"Soon, however, romances became a monstrous assemblage of histories, in which truth and fiction were equally blended, but all without probability; a composition of amorous adventures, and all the extravagant ideas of chivalry. The incidents are infinitely multiplied; destitute of connection, of order, and

art. These are the ancient and miserable romances which Cervantes, in his celebrated satirical romance of Don Quixote, has covered with an eternal ridicule.

"It is, however, from these productions rather in their improved state, that poets of all nations have drawn their richest inventions. The agreeable wildness of that fancy which characterised the eastern nations was caught by the crusaders. When they returned home, they mingled in their own the customs of each country. The Saracens, who were men like themselves, because they were of another religion, and were therefore their enemies, were pictured under the tremendous form of Paynim Giants. The credulous reader of that day followed with trembling anxiety the Red cross Knight. It was thus that fiction embellished religion, and religion invigorated fiction. Such incidents have enlivened the cantos of Ariosto, and adorned the epic of Tasso. Spenser is the child of their creation; and it is certain that we are indebted to them for some of the bold and strong touches of Milton."

To ROMA'NCE. *v. n.* (from the noun.) To lie; to forge (*Pamela*).

ROMA'NCER. *s.* (from *romance*.) A liar; a forger of tales (*Tate*).

To RO'MANIZE *v. a.* (from *roman*, Fr.) To latinize; to fill with modes of the Roman speech (*Dryden*).

ROMANI, a town of European Turkey, in Moldavia, and a bishop's see: seated on the Siret, 50 miles W.S.W. of Jassy.

ROMANIA, a province of Turkey in Europe, 200 miles long and 130 broad; bounded on the N. by Bulgaria, E. by the Black sea, S. by the sea of Marmora and the Archipelago, and W. by Macedonia. It was formerly called Thrace, and is the largest of all the Turkish provinces in Europe. It is fruitful in corn, and has mines of silver, lead, and alum. It is divided into three sangiacates, or governments, the capitals of which are Philipopoli, Gallipoli, and Constantinople.

ROMANO (Giulio), a famous painter, was the disciple of Raphael, who had such an affection for him, that he appointed him, with John Francis Penni, his heir. His conceptions were more extraordinary and more elevated than even those of his master, but not so natural. He was wonderful in the choice of attitudes; but did not perfectly understand the lights and shades, and is frequently harsh and ungraceful. The folds of his draperies, says Du Fresnoy, are neither beautiful nor great, easy nor natural, but all extravagant, like the fantastical habits of comedians. He was, however, superior to most painters, by his profound knowledge of antiquity; and by conversing with the works of the most excellent poets, particularly Homer, he made himself master of the qualifications necessarily required in a great designer. Giulio Romano was also well skilled in architecture. He was employed by cardinal de Medicis, who was afterwards pope under the name of Clement VII. and afterwards went to Mantua, whither he was invited by Frederic Gonzaga, marquis of that city, in order to avoid his being justly punished for his having drawn at Rome the designs of 20 obscene plates, engraved by Mark Antony, to which Aretine added the same number of sonnets. Giulio Romano embellished the city of Mantua with many of his performances both in painting and architecture; and died in that city in 1545, at 54 years of age, much regretted by the marquis, who had an extraordinary friendship for him.

ROMANS (The Epistle of St. Paul to the), was written at Corinth, in the beginning of the year 58, according to some writers; though others place it towards the end of the same year.

The Christian church at Rome consisted of a mixture of Jewish and Gentile converts; and this letter was intended to compose any differences that might arise among them concerning the preferences claimed by either. The Jews assumed glory to themselves that God had given them the law and the prophets; that they had worshipped the true God; and that the Messiah was to spring from their nation. The Gentiles on the contrary maintained, that though God had not been revealed to them, as he had been to the Jews, their philosophers had nevertheless known him; that though the Messiah had been promised, and afterwards sent to the Jews, yet they had rejected him, and the greatest part of them had continued unbelieving. St. Paul shows that neither the one nor the other had reason to boast: not the Gentiles, because though the wisest among them had discovered the true God, by the light of nature, they had not honoured him, but had delivered themselves up to the worship of false gods: nor the Jews, because not having observed their law, they had not availed themselves of the advantages arising from it: and he confounds them both by showing that they are only justified by faith in Jesus Christ, to which God in his mercy hath called both Jew and Gentile, without any merit of theirs. St. Paul's great drift through this whole epistle is evidently to fix on the minds of the Christians to whom he writes, a deep sense of the excellency of the gospel, and to engage them to act suitably to their profession of it.

Such is the general sketch of this Epistle. The particular questions debated in it are these, viz. 1. "Whether the Gentiles are at all to be admitted into the church and kingdom of the Messiah? or, at least, 2. Whether both they and the Jews ought not to observe the ceremonial law along with the Christians? 3. Whether the true religion were so appropriated and confined to the Jewish nation and the Jewish land, as that for their obstinacy they could never be cut off and excluded from the church of God?" Of these questions, which form a key to this very difficult epistle, the first two are handled in the first eight chapters, and some particular branches of them in the 13th, 14th, and 15th. The third is treated in the 9th, 10th, and 11th chapters.

The remainder of the Epistle is taken up in

a variety of practical instructions and exhortations, to charity, peace ableness, purity, &c. the grand design of all which is to engage Christians to act in a manner worthy of that gospel, whose excellence the Apostle had been displaying.

It is for want of attending to the true nature of the questions treated of in this and some of the epistles, that so many vain disputes have perplexed the minds of Christians concerning faith and works, justification and sanctification, election and reprobation, &c. all which have arisen from the grand mistake of applying certain words and phrases in these apostolical letters to themselves or other particular persons, which evidently referred to the state and condition of whole churches, either Jewish or Gentile, at that particular period, and not of private Christians in all ages.

ROMA'NTIC. *a.* (from *romance.*) 1. Resembling the tales of romances; wild (*Keil*). 2. Improbable; false. 3. Fanciful; full of wild scenery (*Thomson*).

ROME, a city of Italy, in Campagna di Roma, capital of the Ecclesiastical State, and the residence of the pope. It is the ancient Latium, and one of the finest and most famous cities in the world, situate on the Tiber, over which it has four bridges. The walls are of brick, in which are 15 gates; and its whole circumference, including that part beyond the Tiber and all belonging to the Vatican, is upward of 16 miles. It is computed to contain 162,000 inhabitants, which though greatly inferior to what it could boast in the days of its ancient power, is considerably more than it could number at some former periods since the fall of the empire. Some of the principal streets are of considerable length, and perfectly straight. That called the Corso is the most frequented. Here the nobility display their equipages during the carnival, and take the air in the evenings, in fair weather. The shops on each side are three or four feet higher than the street; and there is a path for foot passengers, on a level with the shops. The palaces, of which there are several in this street, range in a line with the houses, having no courts before them. The Strada Felice, and the Strada di Porta Pia, are also very long and noble streets. There are no lamps lighted in the streets at night; and all Rome would be in utter darkness, were it not for the candles which the devotion of individuals sometimes places before the statues of the Virgin: these appear glimmering, at vast intervals, like stars in a cloudy night. Rome exhibits a strange mixture of magnificent and interesting, and of common and beggarly objects; the former consists of palaces, churches, fountains, and the remains of antiquity; the latter comprehend all the rest of the city. The church of St. Peter, in the opinion of many, surpasses, in size and magnificence, the finest monuments of ancient architecture. It was begun to be built in 1506, finished in 1621, and is entirely covered both within and without with marble. Its length is 730 feet, the breadth 520, and the height, from the pavement to the top of the cross which crowns the cupola, 450. The high altar under the cupola is 90 feet in height, and of extraordinary magnificence. A complete description of this church, and of its statues, basso-relievos, columns, and various other ornaments, would fill volumes. The cathedral of St. John Lateran, the Romans say, is the most ancient of all the churches of Rome, and the mother of all the churches in Christendom. It contains the Scala Santa, of 28 white marble steps, brought from Jerusalem, by which Christ is said to have ascended to the palace of Caiaphas. To this church every new pope constantly goes first, in a magnificent procession, to take possession of the holy see. The Pantheon is the most perfect of the Roman temples which now remain, and notwithstanding the depredations it has sustained from Goths, Vandals, and popes, is still a beautiful monument of Roman taste. The pavilion of the great altar of St. Peter, and the four wreathed pillars of Corinthian-brass which support it, were formed out of the spoils of the Pantheon, which, after 1900 years, has still a probability of outliving its proud capacious rival. The Pantheon, originally erected to the honour of all the gods, is now become a christian temple, dedicated to the Virgin, and has obtained, from its circular form, the name of the Rotundo. Its height is 150 feet, and its width nearly the same. There are no pillars to support the roof, which is constructed in the manner of a cupola; neither has it any windows, a sufficiency of light being admitted through a central opening in the dome. As the Pantheon is the most entire, the amphitheatre of Vespasian is the most stupendous monument of antiquity in Rome. About one half of the external circuit still remains; from which a pretty exact idea may be formed of the original structure, and by computation it could contain 85,000 spectators. But the antiquities of Rome are too numerous to be minutely described; so that the ancient Forum, now a cow-market; the beautiful column of Trajan, &c. must be passed over. The Campidoglio, built by Michael Angelo, is a beautiful structure, standing on the site of the ancient Capitol, so long the centre of the empire of the world. The body of this palace is the residence of the senators of Rome, and the wings are inhabited by the conservatores of the city. The pope has three superb palaces, of which the principal is the Vatican, near St. Peter's church. The library of this palace is the largest and most complete in the world; rich, especially in manuscripts, in all languages, and of all ages. In Rome the connoisseur will meet with innumerable paintings by the greatest masters, and with the finest works of sculpture, &c. Beside the university, which consists of several noble colleges, there are numerous academies and literary societies. The castle of St. Angelo serves more to keep the city in awe, than to repel any foreign attack. Rome was entered, in 1798, by the French, and in consequence of a tumult, in which their

general was killed, they deposed the pope, abolished the papal government, and erected in its stead a republic, styled the Roman Republic. The aged pope they sent to France, where he died on his various removals; they also sent away a great number of the most valuable statues and paintings, and levied heavy contributions on the inhabitants. However, in 1799, the city was retaken by the allies, the new republic overthrown, and the papal government restored. Rome is 110 miles N.W. of Naples, 410 S.S.W. of Vienna, and 600 S.E. of Paris. Lon. 12. 29 E. Lat. 41. 54 N.

RO'MISH. *a.* (from *Rome.*) Popish (*Ayliffe*).

ROMNEY, a town of the county of Kent. It is one of the cinque-port towns, and is seated on a marsh of the same name, famous for feeding cattle; but the air is very unhealthy. It was once a large and populous place, but the retiring of the sea has reduced it very much: however, it sends two members to parliament.

ROMONT, or RODMONT, a strong town of Switzerland, in the canton of Friburg, seated on a mountain, 10 miles from Friburg, and 12 from Bern. Lon. 7. 1 E. Lat. 46. 50 N.

ROMORENTIN, a town of France, in the department of Loir and Cher, and late province of Blaisois, with a castle, on the brook Morentin, which loses itself in the Saudre. On one of its gates is inscribed *Romo Minor*; but there is nothing to justify this appellation. On the contrary, were it not for its manufactures of serges and cloths, which are very good, this place would be scarcely known. It is 45 miles east of Tours, and 100 south by west of Paris. Lon. 1. 47 E. Lat. 47. 22 N.

ROMP. *s.* 1. A rude, awkward, boisterous, untaught girl (*Arbuthnot*). 2. Rough rude play (*Thomson*).

To ROMP. *v. n.* To play rudely, noisily, and boisterously (*Swift*).

ROMPEE, or ROMPU, in heraldry, is applied to ordinaries that are represented as broken; and to chevrons, bends, or the like, whose upper points are cut off.

ROMSEY. See RUMSEY.

ROMULUS, the son of Mars and the vestal Rhea, otherwise called Silvia and Ilia. Lucius Terentius Fermianus, a person well skilled in the curious sciences of the Chaldæans, having exactly observed the life and death of Romulus, says, he was born the 21st day of Thoth, which is our August, at sun-rising, and that he was begot the 23d of Cheac, which is our November, at three in the afternoon, in the first year of the second olympiad. Plutarch says, that the sun on the day of his conception suffered a great eclipse from eight to nine in the morning: Ant. Contius will have him to be born in the first year of the first olympiad, and Fuccius asserts he was born in the third year of the second olympiad. He with his brother were by Amulius's command exposed to be drowned in the Tiber; but Faustulus, who was Numitor's shepherd, saved him and his brother Remus, and they were both nursed by his wife. The story is, that they were suckled by a she-wolf, because of the lewdness of Laurentia, Faustulus's wife, which gave occasion to the fable. But the thing has been even so represented on the consulary medals, where we have a she-wolf and two twins sucking her. Romulus traced out the plan of his new city and prescribed laws to his people, who coalesced together from all parts into a body; for he made an asylum of a vale lying at the foot of Mons Capitolinus, for all those that came thither; which increased the number of his subjects in a very little time. He regulated matters of religion, divided his people into three tribes, and each tribe into curiæ or parishes: each curia chose its own priests, priestesses, augurs, and camillæ, who were to supply what was requisite for the charge of the sacrifices and sacred feasts that were solemnized throughout a curia at certain times. Pliny speaks of a society instituted by Romulus, somewhat like unto the knights of the former French king's order, and they were called Fratres Arvales; Romulus was the sovereign or grand-master of the order, the ensign of which was a crown of ears of corn tied with a white riband, and this dignity they held for life. He was killed in a scuffle; others affirm that he was cut in pieces by the senate, who gave out that the gods had carried him into heaven. He was deified and worshipped under the name of Quirinus, according to the relation of Proculus: Dionysius of Halicarnassus says, he lived 55 years, and Plutarch 54, and that he reigned 37. We have medals of the emperor Antoninus Pius where Romulus is represented habited like Mars with a javelin in one hand, and with the other holding a trophy on his shoulders with this inscription, *Romulo Augusto.*

Gronovius excepts against all that has been said by such a multitude of authors (concerning the origin of Romulus) for near 2500 years. He pretends that a Greek named Diocles was the first who invented the fable of the she-wolf's suckling Romulus and Remus, who were exposed by Amulius's order to be destroyed, and begotten by Mars upon Rhea Silvia a vestal; and he is so assured that there is no need to refute this fable, that he lays it down as an established principle that Romulus was not born in Italy, but that he came thither from another country; and the proof he gives for it is, that no people of Italy would supply the first inhabitants of Rome with wives. But it is by no means to be thought, in case Romulus was owned to be the grandson of Numitor, after his expelling the usurper Amulius, and re-establishing his grandfather upon the throne, but that he would have found the Albans inclined to make an alliance with him, and to supply him and his people with wives. Whereas it is supposed he had recourse to the Sabines or some other people: who having refused him, he resolved upon the entire extirpation of them. Other authors will have Romulus to be a Greek by birth; for this his name implies, as Salmasius says, who thought

the word Romulus to be a diminitive of ῥωμὴ, which in the Eolic dialect signifies strength: Gronovius is of opinion, that Romulus was neither a Gaul nor African, but a Syrian; since Josephus and Nicephorus translated the name by υἱος Ρωμελιω, the son of Romelia, of whom mention is made in scripture.

RONCIGLIONE, a town of Italy, in the ecclesiastical state, and patrimony of St. Peter. Lon. 13. E. Lat. 42. 12 N. It is a small place, but had a pretty good trade, and was one of the richest in the province while it belonged to the dukes of Parma, which was till 1646, when pope Innocent X. became master of it, and it has ever since continued in the possession of his sucessors.

RO'NDEAU. *s.* A kind of ancient poetry, commonly consisting of thirteen verses; of which eight have one rhyme and five another: it is divided into three couplets, and at the end of the second and third, the beginning of the *rondeau* is repeated in an equivocal sense, if possible (*Trevoux*).

RONDELETIA, in botany, a genus of the class pentandria, order monogynia. Corol funnel-form; capsule two-celled, inferior, many-seeded, roundish, crowned. Thirteen species; some with numerous seeds; others with seeds mostly solitary: natives of the West Indies or South America.

The species chiefly cultivated is rondeletia Americana, American rondeletia; with a woody stalk ten or twelve feet high; leaves sessile, opposite, lanceolate: panicle forked; flowers sessile, white.

RONDLE, a round mass.

RONDO, (Ital.) or RONDEAU (Fr.). In music, a composition, vocal or instrumental, generally consisting of three strains, the first of which closes in the original key, while each of the others is so constructed in point of modulation as to reconduct the ear in an easy and natural manner to the first strain. This construction is an inherent and indispensable quality in the rondo, since it takes its name from the circumstance of the melody going round, after both the second and third strain, to the first strain, with which it finally closes. In the vocal rondo considerable discernment is requisite in the choice of proper words. The lines of the first strain should be complete in themselves, while those of each of the other strains should not only rise out of them, but, like the music, lead to them again.

RO'NION. *s.* (*rognon*, French, the loins.) A fat bulky woman (*Shakspeare*).

RONSARD (Peter de), a French poet, born in the Vendomois, in 1524, was educated in the college of Navarre, at Paris. He was page to the duke of Orleans, who transferred him to James Stuart king of Scotland, who had married Madelaine of France. His poems were once held in extraordinary estimation. He died in 1585.

RONT. *s.* An animal stinted in the growth; commonly pronounced *runt* (*Spenser*).

ROOD. *s.* (from *rod.*) 1. The fourth part of an acre in square measure, or 1210 square yards (*Swift*). 2. A pole; a measure of sixteen feet and a half in long measure (*Milton*). 3. (ꝓoꝺe, Saxon.) The cross; sometimes an image of a saint (*Shakspeare*).

ROO'DLOFT. *s.* (*rood* and *loft.*) A gallery in the church on which reliques or images were set to view.

ROOF. *s.* (hꝛoꝼ, Saxon.) 1. The cover of a house (*Shakspeare*). 2. The house in general (*Chapman*). 3. The vault; the inside of the arch that covers a building (*Hooker*). 4. The palate; the upper part of the mouth (*Bacon*).

To ROOF. *v. a.* (from the noun.) 1. To cover with a roof (*Creech*). 2. To enclose in a house (*Shakspeare*).

ROOF, in architecture, the uppermost part of a building; being that which forms the covering of the whole.

The roof contains the timber-work and its furniture of slate or tile, wherewith the house is covered, or that which serves it as a cover. Though carpenters usually restrain roof to the timber-work only.

The roofs in Persia and Arabia are flat, but those of Greece are without exception sloping. It seems therefore a gross violation of the true principles of taste in architecture (at least in the regions of Europe), to take away or to hide the roof of a house; and it must be ascribed to that rage for novelty which is so powerful in the minds of the rich. Our ancestors seemed to be of a very different opinion, and turned their attention to the ornamenting of their roofs as much as any other part of a building. They showed them in the most conspicuous manner, running them up to a great height, broke them into a thousand fanciful shapes, and stuck them full of highly dressed windows. We laugh at this, and call it gothic and clumsy; and our great architects, not to offend any more in this way, conceal the roof altogether by parapets, balustrades, and other contrivances. Our forefathers certainly did offend against the maxims of true taste, when they enriched a part of a house with marks of elegant habitation, which every spectator must know to be a cumbersome garret: but their successors no less offend, who take off the cover of the house altogether, and make it impossible to know whether it is not a mere skreen or colonnade we are looking at.

The architect is anxious to present a fine object, and a very simple outline discusses all his concerns with the roof. He leaves it to the carpenter, whom he frequently puzzles (by his arrangements) with coverings almost impossible to execute. Indeed it is seldom that the idea of a roof is admitted by him into his great compositions; or if he does introduce it, it is from mere affectation, and we may say pedantry. A pediment is frequently stuck up in the middle of a grand front, in a situation where a roof cannot perform its office; for the rain which is supposed to flow down its sides must be received on the top of the level buildings which flank it. This is a manifest incongruity. The tops of dressed windows, trifling porches, and sometimes a projecting por-

tico, are the only situations in which we see the figure of a roof correspond with its office. Having thus lost sight of the principle, it is not surprising that the draughtsman (for he should not be called architect) runs into every whim: and we see pediment within pediment, a round pediment, a hollow pediment, and the greatest of all absurdities, a broken pediment. Nothing could ever reconcile us to the sight of a man with a hat without its crown, because we cannot overlook the use of a hat.

But when one builds a house, ornament alone will not do. We must have a cover; and the enormous expense and other great inconveniences which attend the concealment of this cover by parapets, balustrades, and screens, have obliged architects to consider the pent roof as admissible, and to regulate its form. Any man of sense, not under the influence of prejudice, would be determined in this by its fitness for answering its purpose. A high pitched roof will undoubtedly shoot off the rains and snows better than one of a lower pitch. The wind will not so easily blow the dropping rain in between the slates, nor will it have so much power to strip them off. A high pitched roof will exert a smaller thrust on the walls, both because its strain is less horizontal, and because it will admit of lighter covering. But it is more expensive, because there is more of it. It requires a greater size of timbers to make it equally strong, and it exposes a greater surface to the wind.

There have been great changes in the pitch of roofs: our forefathers made them very high, and we make them very low. It does not, however, appear that this change has been altogether the effect of principle. In the simple unadorned habitations of private persons, every thing comes to be adjusted by an experience of inconveniences which have resulted from too low pitched roofs; and their pitch will always be nearly such as suits the climate and covering. Our architects, however, go to work on different principles. Their professed aim is to make a beautiful object. The sources of the pleasures arising from what we call taste are so various, so complicated, and even so whimsical, that it is almost in vain to look for principle in the rules adopted by our professed architects. We cannot help thinking, that much of their practice results from a pedantic veneration for the beautiful productions of Grecian architecture. Such architects as have written on the principles of the art in respect of proportions, or what they call the ordonnance, are very much puzzled to make a chain of reasoning; and the most that they have made of the Greek architecture is, that it exhibits a nice adjustment of strength and strain. But when we consider the extent of this adjustment, we find it is wonderfully limited. The whole of it consists of a basement, a column, and an entablature; and the entablature, it is true, exhibits something of a connection with the framework and roof of a wooden building; and we believe that it really originated from this in the hands of the orientals, from whom the Greeks certainly borrowed their forms and their combinations. We could easily show in the ruins of Persepolis, and among the tombs in the mountains (which were long prior to the Greek architecture), the fluted column, the base, the Ionic and Corinthian capital, and the Doric arrangement of lintels, beams, and rafters, all derived from unquestionable principle. The only addition made by the Greeks was the pent roof; and the changes made by them in the subordinate forms of things are such as we should expect from their exquisite judgment of beauty.

But the whole of this is very limited; and the Greeks, after making the roof a chief feature of a house, went no further, and contented themselves with giving it a slope suited to their climate. This we have followed, because in the milder parts of Europe we have no cogent reason for deviating from it; and if any architect should deviate greatly in a building where the outline is exhibited as beautiful, we should be disgusted; but the disgust, though felt by almost every spectator, has its origin in nothing but habit. In the professed architect or man of education, the disgust arises from pedantry: for there is not such a close connection between the form and uses of a roof as shall give precise determinations; and the mere form is a matter of indifference.

We should not therefore reprobate the high-pitched roofs of our ancestors, particularly on the continent. It is there where we see them in all the extremity of the fashion, and the taste is by no means exploded as it is with us. A baronial castle in Germany and France is seldom rebuilt in the pure Greek style, or even like the modern houses in Britain; the high pitched roofs are retained. We should not call them Gothic, and ugly because Gothic, till we show their principle to be false or tasteless. Now we apprehend that it will be found quite the reverse; and that though we cannot bring ourselves to think them beautiful, we ought to think them so. The construction of the Greek architecture is a transference of the practices that are necessary in a wooden building to a building of stone. To this the Greeks have adhered, in spite of innumerable difficulties. Their marble quarries, however, put it in their power to retain the proportions which habit had rendered agreeable. But it is next to impossible to adhere to these proportions with freestone or brick, when the order is of magnificent dimensions. Sir Christopher Wren saw this; for his mechanical genius was equal to his taste. He composed the front of St. Paul's church in London of two orders, and he coupled his columns; and still the lintels which form the architrave are of such length that they could carry no additional weight, and he was obliged to truss them behind. Had he made but one order, the architrave could not have carried its own weight.

The principle of what is called a Norman roof is extremely simple. The rafters all butted on joggled king posts AF, BG, CH, &c. (pl. 149, fig. 3.) and braces or ties were then di-

posed in the intervals. In the middle of the roof HB and HD are evidently ties in state of extension, while the post CH is compressed by them. Towards the walls on each side, as between B and F, and between F and L, they are braces, and are compressed. The ends of the post were generally ornamented with knots of flowers, embossed globes, and the like, and the whole texture of the truss was exhibited and dressed out.

This construction admits of employing very short timbers; and this very circumstance gives greater strength to the truss, because the angle which the brace or tie makes with the rafter is more open. We may also perceive that all thrust may be taken off the walls. If the pieces AF, BF, LF, be removed, all the remaining diagonal pieces act as ties, and the pieces directed to the centre act as struts; and it may also be observed, that the principle will apply equally to a straight or flat roof or to a floor. A floor such as *a b c*, having the join in two pieces *a b*, *b c*, with a strut *b d*, and two ties, will require a much greater weight to break it than if it had a continued joist *a c* of the same scantling. And, lastly, a piece of timber acting as a tie is much stronger than the same piece acting as a strut; for in the latter situation it is exposed to bending, and when bent it is much less able to withstand a very great strain. It must be acknowledged, however, that this advantage is balanced by the great inferiority of the joints in point of strength. The joint of a tie depends wholly on the pins; for this reason ties are never used in heavy works without strapping the joints with iron. In the roofs we are now describing, the diagonal pieces of the middle part only act purely as ties, while those towards the sides act as struts or braces. See farther the article CARPENTRY.

ROOFY. *a.* (from *roof*.) Having roofs (*Dryden*).

ROOK, in ornithology. See CERVUS.

ROOK denotes, 1. A common man at chess (*Dryden*). 2. A cheat; a trickish rapacious fellow (*Wycherly*).

To ROOK. *v. n.* To rob; to cheat (*Hudibras*).

ROOKE (Sir George), a gallant English admiral, was born of a good family in Kent, in 1650. He entered early into the navy, and rose by his merit to the first honours of his profession. He gave eminent proofs of his skill and courage in many expeditions, particularly in burning the French ships at La Hogue, at the battle off Malaga, and in the glorious action at Vigo. The taking of Gibraltar shewed his spirit and sagacity in the clearest light. He sat in parliament for Portsmouth, and distinguished himself as an honest independent senator Sir George died in 1709, and was buried in Canterbury cathedral.

ROOKE (Laurence), an English astronomer, was born at Deptford, in Kent, in 1623, and educated at King's college, Cambridge, from whence he removed to Oxford. In 1652 he was appointed Gresham professor of astronomy, and distinguished himself as one of the founders of the Royal Society. He died in 1662. Some astronomical tracts by him have been printed.

ROOKERY, a place where rooks build their nests, breed their young, and usually inhabit and rest in the night, after they have been abroad feeding in the day. Rooks may be taken the same way as pigeons. They are very destructive of corn, especially of wheat, though they clear the ground of caterpillars, that do incredible damage by eating the roots of the corn, and on this account may be considered the farmers friends. They search out the lands where it is sown, and watching them more carefully than the owners, perceive when the seed first begins to shoot up its little blade: as this is the time of feeding on it, they will not be at the pains of searching for it at random in the sown land, for that is more trouble than so small a grain will requite them for; but, as soon as these blades appear they are directed, without loss of time or pains, by them to the places where the grain lies, and in three or four days time they will root up such vast quantities of them, that a good crop is often thus destroyed in embryo. After a few days, the wheat beginning to grow, its blades appear green above ground, and then the time of danger from these birds is over; for then the seeds are so far robbed of their mealy matter, that they are of no value to that bird, and it will no longer give itself the trouble to destroy them.

The best remedy the farmer has, is to mark well the time of the corn's being in the condition to feed upon it; and as this lasts only a few days, he should keep a boy constantly in pay to watch the field from daybreak till the dusk of the evening. Every time they settle upon the ground, or fly over it, the boy is to halloo, and throw up a dead rook into the air: this will always make them rise, and by degrees they will be so tired of this constant disturbance, that they will seek out other places of preying, and will leave the ground even before the time of the corn's being unfit for them. The reason of their rising so suddenly at the tossing up of a dead rook is, that they are naturally extremely apprehensive of danger, and always alarmed when one of their comrades ascends. They take this for the rising of an out-bird, and all fly off at the signal. The shooting young rooks before they fly, when they are called perchers, is a common exercise for young shooters, but there cannot be a worse, as the ample time they have to adjust the aim is directly contrary to the sudden precision required, by the person who shoots flying.

ROOKY, *a.* Inhabited by rooks (*Shakspeare*).

ROOM. *s.* (rum, Saxon; *rums*, Gothic.) 1. Space; extent of place (*Milton*). 2. Space or place unoccupied (*Bentley*). 3. Way unobstructed (*Creech*). 4. Place of another; stead (*Calamy*). 5. Unobstructed opportunity (*Addison*). 6. Possible admission (*Philips*). 7. An apartment in a house (*Pope*).

ROO'MAGE. *s.* (from *room.*) Space; place (*Wotton*).

ROO'MINESS. *s.* (from *roomy.*) Space; quantity of extent.

ROO'MY. *a.* (from *room.*) Spacious; wide; large (*Dryden*).

ROOST. *s.* (hpoꝛt, Sax.) 1. That on which a bird sits to sleep (*Dryden*). 2. The act of sleeping (*Derham*).

To ROOST. *v. n.* (*roesten*, Dutch.) 1. To sleep as a bird (*L'Estrange*). 2. To lodge. In burlesque.

ROOT. *s.* (*rot*, Swedish; *roed*, Danish.) 1. That part of the plant which rests in the ground, and supplies the stems with nourishment (*Evelyn*). 2. The bottom; the lower part (*Milton*). 3. A plant, of which the root is esculent (*Watts*). 4. The original; the first cause (*Davies*). 5. The first ancestor (*Shakspeare*). 6. Fixed residence. 7. Impression; durable effect (*Hooker*).

To ROOT. *v. n.* (from the noun.) 1. To fix the root; to strike far into the earth (*Shakspeare*). 2. To turn up earth. 3. To sink deep (*Fell*).

To ROOT. *v. a.* 1. To fix deep in the earth (*Dryden*). 2. To impress deeply (*South*). 3. To turn up out of the ground; to eradicate; to extirpate (*Raleigh*). 4. To destroy; to banish.

ROOT, in arithmetic and algebra, denotes a quantity which being multiplied by itself produces some higher power; or a quantity considered as the basis or foundation of a higher power, out of which this arises and grows, like as a plant from its root.

In the involution of powers, from a given root, the root is also called the first power; when this is once multiplied by itself, it produces the square or second power; this multiplied by the root again, makes the cube or 3d power; and so on. And hence the roots also come to be denominated the square-root, or cube-root, or 2d root, or 3d root, &c. according as the given power or quantity is considered as the square, or cube, or 2d power, or 3d power, &c. Thus, 2 is the square-root or 2d root of 4, and the cube-root or 3d root of 8, and the 4th root of 16, &c.

Hence, the square-root is the mean proportional between 1 and the square or given power; and the cube-root is the first of two mean proportionals between 1 and the given cube; and so on.

To extract the root of a given number or power. This is the same thing as to find a number or quantity, which being multiplied the proper number of times, will produce the given number or power. So, to find the cube-root of 8, is finding the number 2, which multiplied twice by itself produces the given number 8.

For the usual methods of extracting the roots of numbers, see the common treatises on arithmetic.

A root of any power, that consists of two parts, is called a binomial root; as 12 or 10 + 2. If it consist of three parts, it is a trinomial root; as 126 or 100 + 20 + 6. And so on.

The extraction of the roots of algebraic quantities, is also performed after the same manner as that of numbers; as may be seen in any treatise on algebra. See also the article EXTRACTION.

A general method for all roots, is also by Newton's binomial theorem. See BINOMIAL THEOREM.

Finite approximating rules for the extraction of roots have also been given by several authors, as Raphson, De Lagney, Halley, &c. See the articles APPROXIMATION and EXTRACTION. See also Newton's Universal Arith. the Appendix; Philos. Trans. numb. 210, or Abridg. vol. 1, pa. 81; Maclaurin's Alg. pa. 242; Simpson's Alg. pa. 155; or his Essays, pa. 82, or his Dissertations, pa. 102, or his Select Exerc. pa. 215: where various general theorems for approximating to the roots of pure powers are given.

Dr. Halley's formula for the roots of the first six powers, may be thus expressed. Let a^2, a^3, a^4, &c. be the nearest rational power, whether above or below, and b the difference: then

$$\sqrt{(a^2 \pm b)} = a \pm \frac{ab}{2a^2 \pm \frac{1}{2}b},$$

$$\sqrt[3]{(a^3 \pm b)} = \tfrac{1}{2}a + \sqrt{\tfrac{1}{4}a^2 \pm \frac{b}{3a}}, \text{ or } a \pm \frac{ab}{3a^3 \pm b}$$

$$\sqrt[4]{(a^4 \pm b)} = \tfrac{3}{4}a + \sqrt{\tfrac{1}{8}a^2 \pm \frac{b}{6a^2}}, \text{ or } a \pm \frac{ab}{4a^4 \pm \frac{3}{4}b}$$

$$\sqrt[5]{(a^5 \pm b)} = \tfrac{3}{4}a + \sqrt{\tfrac{1}{16}a^2 \pm \frac{b}{10a^3}}, \text{ or } a \pm \frac{ab}{5a^5 \pm 2b}$$

$$\sqrt[6]{(a^6 \pm b)} = \tfrac{4}{7}a + \sqrt{\tfrac{1}{21}a^2 \pm \frac{b}{15a^4}}, \text{ or } a \pm \frac{ab}{6a^6 \pm \frac{5}{2}b}$$

From whence the nature and shape, both of the rational and of the irrational formula for any higher powers, may be at once seen.

But the most commodious and general rule of any, for such approximations, is that which was invented by Dr. Hutton, and explained in his Tracts, vol. 1, pa. 49: which theorem is this;

$$\frac{n+1 \,.\, \mathrm{N} + n - 1 \,.\, a^n}{n-1 \,.\, \mathrm{N} + n + 1 \,.\, a^n} a = \sqrt[n]{\mathrm{N}}.$$ That is, having to extract the nth root of the given number N; that, a^n the nearest rational power

to that given quantity N, whether greater or less, its root of the same kind being a; then the required root, or $\sqrt[n]{N}$, will be as is expressed in this formula above; or the same expressed in a proportion will be thus:

$\overline{n-1} \cdot N + \overline{n+1} \cdot a^n : n+1 \cdot N + \overline{n-1} \cdot a^n :: a : \sqrt[n]{N}$ the root sought very nearly. Which rule includes all the particular rational formulas of De Lagney, and Halley, which were separately investigated by them; and yet the general formula is perfectly simple and easy to apply, and more easily kept in mind than any one of the said particular formulas.

Ex. Suppose it be required to double the cube, or to extract the cube root of the number 2.

Here $N = 2$, $n = 3$, the nearest root $a = 1$, also $a^3 = 1$; hence, for the cube root the formula becomes $\frac{4N + 2a^3}{2N + 4a^3} a$ or $\frac{2N + a^3}{N + 2a^3} a = \sqrt[3]{N}$.

But $N + 2a^3 = 4$, and $2N + a^3 = 5$; therefore as $4 : 5 :: 1 : \frac{5}{4} = 1 \cdot 2^5$ = the root nearly by a first approximation.

Again, for a second approximation, take $a = \frac{5}{4}$, and consequently $a^3 = \frac{125}{64}$;

hence $2N + a^3 = 4 + \frac{125}{64} = \frac{381}{64}$,

and $N + 2a^3 = 2 + \frac{250}{64} = \frac{378}{64}$;

therefore as 378 : 381, or as 126 : 127 : : $\frac{5}{4} : \frac{635}{504} = 1{\cdot}259921$ &c. for the required cube root of 2, which is true even in the last place of decimals.

Root of an Equation, denotes the value of the unknown quantity in an equation; which is such a quantity, as being substituted instead of that unknown letter, into the equation, shall make all the terms to vanish, or both sides equal to each other.

Every equation has as many roots, or values of the unknown quantity, as are the dimensions or highest power in it. As a simple equation one root, a quadratic two, a cubic three, and so on.

Roots are positive or negative, real or imaginary, rational or radical, &c. See EQUATION, ALGEBRA, and QUADRATICS.

The roots of the equation $x^n - 1 = 0$ or of $x^n = 1$, are 1, $a + \sqrt{a^2-1}$, $a - \sqrt{a^2-1}$, $b + \sqrt{b^2-1}$ $b - \sqrt{b^2-1}$, $c + \sqrt{c^2-1}$, $c - \sqrt{c^2-1}$, &c. where $a = \cos. \frac{360°}{n}$, $b = \cos. \frac{2 \cdot 360°}{n}$, $c = \cos. \frac{3 \cdot 360°}{n}$, $d = \cos. \frac{4 \cdot 360°}{n}$, &c.

ROOT, in botany, that organ of a vegetable which draws in the nourishment, and produces the herb with the fructification.—It is composed of medulla or pith, wood, inner and outer bark: and consists of the caudex, stock or main body; and the ridiculæ or fibres, by which the moisture is immediately imbibed. We commonly regard all that part of a vegetable only which is under ground as the root; but Linnéus comprehends the ascending caudex, or what we commonly term the body, trunk or bole, within his idea. According to him, therefore, trees and shrubs are all root, except the leaves and fructification; and consequently if a tree be turned upside down, the descending caudex will produce leaves, and the ascending caudex will put forth fibres.

A root in duration is—1. Annual. 2. Biennial. 3. Perennial.

In form,—*a*. 4. Fibrose. 5. Branching. 6. Fusiform. 7. Præmorse or bitten off.

b. 8. Creeping. 9. Jointed. 10. Toothed.

c. 11. Globular. 12. Tuberous. 13. Fascicled or bundled. 14. Palmate.

d. 15. Bulbous. 16. Granulate. 17. Tunicated. 18. Solid. 19. Scaly.

In substance,—20. A bulb. 21. A tuber. 22. A fibre. 23. A fibril.

ROOT (China), in botany. See SMILAX.

ROOT (False China), in botany. See SENECIO.

ROOT (Hollow), in botany. See ADOXA.

ROOT (Rose), in botany. See RHODIOLA.

ROOT (Rattle-snake), in botany. See POLYGALA.

ROOT (Snake), in botany. See ARISTOLOCHIA.

ROOT (Sweet), in botany. See ROSA.

ROOTED. *a*. (from *root*.) Fixed; deep; radical (*Hammond*).

ROOTEDLY. *ad*. (from *rooted*.) Deeply; strongly (*Shakspeare*).

ROOTING STEM. In botany. Caulis radicans. Bending to the earth and striking root, but not creeping along.—A rooting leaf. Folium radicans. Shooting forth roots; as in some aquatic plants: this is sometimes called folium radicatum.

ROOT-LEAF. Folium radicale. In botany. Proceeding immediately from the root, or growing next the ground: frequently different from the leaves on the stem and branches; as in campanula rotundifolia.—Peduncles sometimes spring from the root, and may be named root-peduncles.

ROOTLET, radicle, or fibre. See RADICLE.

Root-leaf and rootlet are more proper in English than radical leaf and radicle, on account of the analogy.

ROOTY. *a*. (from *root*.) Full of roots.

ROPE. (nap, Saxon; *roep*, *roop*, Dutch.) 1. A cord; a string; a halter (*Hudibras*). 2. Any row of things depending: as, *a rope of onions*.

To ROPE. *v. n.* (from the noun.) To draw out into viscosities; to concrete into glutinous filaments (*Dryden*).

ROPE-MAKING. The art of uniting ani-

mal or vegetable fibres into an aggregate line, so that the whole may concur in one joint action; and be employed under the form of string, cord, halter, haulser or cable.

Animal fibres are so much more expensive than those of plants, that they are comparatively employed but seldom. Those of this kind most commonly used are generally obtained from the intestines of ruminating quadrupeds, and especially sheep and lambs; the tendrils of the ovary of the squalus canicula (*dog-fish*), or other fishes of a similar structure, or the hair of various animals. The cord produced by the first is called *cat-gut*, and is used, of different powers and diameters, by musicians, watch-makers, cutlers, turners, and a variety of other artificers: the fibre of the second is chiefly employed in angling, and more frequently single than in a combined state. It is known by the name of Indian-grass. It is the third material, however, that is chiefly had recourse to; and where there is no great degree of friction, it forms a rope or cord of far greater durability than any that can be obtained from vegetables. Animal hair, indeed, from its being impervious to moisture, is capable of resisting all weathers, almost for ever; and where elasticity is required offers this property to any extent we can wish. It is not many animals however that afford this material of a sufficient length for the purpose of cordage; and hence, it is obvious, that hair-ropes must be of much greater expense than hempen, or other vegetable ropes. Hair, moreover, does not bear friction so well as many vegetable fibres; and hence, where this effect cannot be avoided, there is another inconvenience in employing it.

It is hence obvious that the rope-maker must derive his chief material from the vegetable kingdom; from the inner bark of some of the plants we have noticed in a former article. This art consists in uniting the strength of different fibres which are thus offered to him. This would be done in the easiest manner by laying the fibres parallel to each other, and fastening the bundle at the two ends; but this would be of very limited use, because the fibres are short, not exceeding three feet and a half at an average. They must therefore be entangled together, in such a manner, that the strength of a fibre shall not be able to draw it out from among the rest of the bundle. This is done by twisting or twining them together, which causes them mutually to compress each other. When the fibres are so disposed in a long skain, that their ends succeed each other along its length, without many of them meeting in one place; and this skain is twisted round; we may cause them to compress each other to any degree we please; and the friction on a fibre which we attempt to pull out may be more than its cohesion can overcome. It will therefore break. Consequently, if we pull at this twisted skain, we shall not separate it by drawing one parcel out from among the rest, but the whole fibres will break: and if the distribution of the fibres has been very equable, the skain will be nearly of the same strength in every part. If there is any part where many ends of fibres meet, the skain will break in that part.

We know very well that we can twist a skain of fibres so very hard, that it will break with any attempt to twist it harder. In this state all the fibres are already strained to the utmost of their strength. Such a skain of fibres can have no strength. It cannot carry a weight, because each fibre is already strained in the same manner as if loaded with as much weight as it is able to bear. What we have said of this extreme case is true in a certain extent of every degree of twist that we give the fibres. Whatever force is actually exerted by a twisted fibre, in order that it may sufficiently compress the rest to hinder them from being drawn out, must be considered as a weight hanging on that fibre, and must be deducted from its absolute strength of cohesion, before we can estimate the strength of the skain. The strength of the skain is the remainder of the absolute strength of the fibres, after we have deduced the force employed in twisting them together. From this observation may be established a fundamental principle in rope-making, that all twisting, beyond what is necessary for preventing the fibres from being drawn out without breaking, diminishes the strength of the cordage, and should be avoided when in our power.

It is necessary then to twist the fibres of hemp together, in order to make a rope; but we should make a very bad rope if we contented ourselves with twisting together a bunch of hemp sufficiently large to withstand the strains to which the rope is to be exposed. As soon as we let it go out of our hands, it would untwist itself, and be again a loose bundle of hemp; for the fibres are strained, and they are in a considerable degree elastic; they contract again, and thus untwist the rope or skain. It is necessary to contrive the twist in such a manner, that the tendency to untwist in one part may act against the same tendency in another and balance it. The process, therefore, of rope-making is more complicated.

The first part of this process is spinning of rope-yarns, that is, twisting the hemp in the first instance. This is done in various ways, and with different machinery, according to the nature of the intended cordage. We shall confine our description to the manufacture of the larger kinds, such as are used for the standing and running rigging of ships.

An alley or walk is inclosed for the purpose, about 200 fathoms long, and of a breadth suited to the extent of the manufacture. It is sometimes covered above. At the upper end of this rope-walk is set up a spinning-wheel, the band of which goes over several rollers called whirls, turning on pivots in brass holes. The pivots at one end come through the frame, and terminate in little hooks. The wheel being turned by a winch, gives motion in one direction to all those whirls. The spinner has a bundle of dressed hemp round his waist, with the two ends meeting before him. The hemp is laid in this bundle in the same way that women spread the flax on the distaff. There is great variety in this; but the general aim is to lay the fibres in such a manner, that as long as the bundle lasts there may be an equal number of the ends at the extremity, and that a fibre may never offer itself double or in a bight. The spinner draws out a proper number of fibres, twists them with his fingers, and having got a sufficient length detached, he fixes it to the hook of a whirl. The wheel is now turned, and the skain is twisted, becoming what is called a rope-yarn, and the spinner walks backwards down the rope-walk. The part already twisted draws along with it more fibres out of the bundle. The spinner aids this with his fingers, supplying hemp in due proportion as he walks away from the wheel, and taking care that the fibres come in equally from both

sides of his bundle, and that they enter always with their ends, and not by the middle, which would double them. He should also endeavour to enter every fibre at the heart of the yarn. This will cause all the fibres to mix equally in making it up, and will make the work smooth, because one end of each fibre is by this means buried among the rest, and the other end only lies outward; and this, in passing through the grasp of the spinner, who presses it tight with his thumb and palm, is also made to lie smooth. The greatest fault that can be committed in spinning is to allow a small thread to be twisted off from one side of the hemp, and then to cover this with hemp supplied from the other side; for it is evident, that the fibres of the central thread make very long spirals, and the skin of fibres which covers them must be much more oblique. This covering has but little connection with what is below it, and will easily be detached. But even while it remains, the yarn cannot be strong, for on pulling it, the middle part, which lies the straightest, must bear all the strain, while the outer fibres that are lying obliquely, are only drawn a little more parallel to the axis. This defect will always happen if the hemp is supplied in a considerable body to a yarn that is then spinning small. In whatever part of the yarn it is made to enter, it becomes a sort of loosely connected wrapper. Such a yarn, when untwisted a little, will have a very different appearance to the eye than more perfect yarn. A good spinner therefore endeavours always to supply the hemp in the form of a thin flat skain with his left hand, while his right is employed in grasping firmly the yarn that is twining off, and in holding it tight from the whirl, that it may not run into loops or kinks.

It is evident, that both the arrangement of the fibres and the degree of twisting depend on the skill and dexterity of the spinner, and that he must be instructed, not by a book, but by a master. The degree of twist depends on the rate of the wheel's motion, combined with the retrograde walk of the spinner.

We may suppose him arrived at the lower end of the walk, or as far as is necessary for the intended length of his yarn. He calls out, and another spinner immediately detaches the yarn from the hook of the whirl, gives it to another, who carries it aside to the reel; and this second spinner attaches his own hemp to the whirl-hook. In the mean time, the first spinner keeps fast hold of the end of his yarn; for the hemp, being dry, is very elastic, and if he were to let it go out of his hand, it would instantly untwist, and become little better than loose hemp. He waits, therefore, till he sees the reeler begin to turn the reel, and he goes slowly up the walk, keeping the yarn of an equal tightness all the way, till he arrives at the wheel, where he waits with his yarn in his hand till another spinner has finished his yarn. The first spinner takes it off the whirl-hook, joins it to his own, that it may follow it on the reel, and begins a new yarn.

Rope-yarns, for the greatest part of the large rigging, are from a quarter of an inch to somewhat more than a third of an inch in circumference, or of such a size that 160 fathoms weigh from 3¼ to 4 pounds when white. The different sizes of yarns are named from the number of them contained in a strand of a rope of three inches in circumference. Few are so coarse that 16 will make a strand of British cordage; 18 is not unfrequent for cable yarns, or yarns spun from harsh and coarse hemp; 25 is, we believe, the finest size which is worked up for the rigging of a ship. Much finer are indeed spun for sounding-lines, fishing-lines, and many other marine uses, and for the other demands of society. Ten good spinners will work up above 600 weight of hemp in a day; but this depends on the weather. In very dry weather the hemp is very elastic, and requires great attention to make smooth work. In the warmer climates the spinner is permitted to moisten the rag with which he grasps the yarn in his right hand for each yarn. No work can be done in an open spinning-walk in rainy weather, because the yarns would not take on the tar, if immediately tarred, and would rot if kept on the reel for a long time.

The second part of the process is the conversion of the yarns into what may with propriety be called a rope, cord, or line. That we may have a clear conception of the principle which regulates this part of the process, we shall begin with the simplest possible case, the union of two yarns into one line. This is not a very usual fabric for rigging, but we select it for its simplicity.

When hemp has been split into very fine fibres by the hatchel, it becomes exceedingly soft and pliant, and after it has lain for some time in the form of fine yarn, it may be unreeled and thrown loose, without losing much of its twist. Two such yarns may be put on the whirl of a spinning-wheel, and thrown, like flaxen yarn, so as to make sewing thread. It is in this way, indeed, that the sailmakers' sewing thread is manufactured; and when it has been kept on the reel, or on balls or bobbins, for some time, it retains its twist as well as its uses require. But this is by no means the case with yarns spun for great cordage. The hemp is so elastic, the number of fibres twisted together is so great, and the diameter of the yarn (which is a sort of lever on which the elasticity of the fibres exerts itself) is so considerable, that no keeping will make the fibres retain this constrained position. The end of a rope-yarn being thrown loose, it will immediately untwist, and this with considerable force and speed. It would, therefore, be a fruitless attempt to twist two such yarns together; yet the ingenuity of man has contrived to make use of this very tendency to untwist not only to counteract itself, but even to produce another and a permanent twist, which requires force to undo it, and which will recover itself when this force is removed. Every person must recollect, that when he had twisted a packthread very hard with his fingers between his two hands, if he slackens the thread by bringing his hands nearer together, the packthread will immediately curl up, running into loops or kinks, and will even twist itself into a neat and firm cord.

The component parts of a rope are called strands, and the operation of uniting them with a permanent twist is called laying or closing, the latter term being chiefly appropriated to cables and other very large cordage.

Lines and cordage less than 1½ inches circumference are laid at the spinning-wheel. The workman fastens the ends of each of two or three yarns to separate whirl-hooks. The remote ends are united in a knot. This is put on one of the hooks of a swivel called the loper, represented in fig. 213, and care is taken that the yarns are of equal length and twist. A piece of soft cord is put on the other hook of the loper; and, being put over

a pulley several feet from the ground, a weight is hung on it, which stretches the yarn. When the workman sees that they are equally stretched, he orders the wheel to be turned in the same direction as when twining the yarns. This would twine them harder; but the swivel of the loper gives way to the strain, and the yarns immediately twist around each other, and form a line or cord. In doing this, the yarns lose their twist. This is restored by the wheel. But this simple operation would make a very bad line, which would be slack, and not hold its twist; for, by the turning of the loper, the strands twist immediately together, to a great distance from the loper. By this turning of the loper the yarns are untwisted. The wheel restores their twist only to that part of the yarns that remains separate from the others, but cannot do it in that part where they are already twined round each other, because their mutual pressure prevents the twist from advancing. It is, therefore, necessary to retard this tendency to twine, by keeping the yarns apart. This is done by a little tool called the top.

It is a truncated cone, have three or more notches along its sides, and a handle called the staff. This is put between the strands, the small end next the loper, and it is pressed gently into the angle formed by the yarns which lie in the notches. The wheel being now turned, the yarns are more twisted, or hardened up, and their pressure on the top gives it a strong tendency to come out of the angle, and also to turn round. The workman does not allow this till he thinks the yarns sufficiently hardened. Then he yields to the pressure, and the top comes away from the swivel, which immediately turns round, and the line begins to lay. Gradually yielding to this pressure, the workman slowly comes up towards the wheel, and the laying goes on, till the top is at last close to the wheel, and the work is done. In the mean time, the yarns are shortened, both by the twining of each and the laying of the cord. The weight, therefore, gradually rises. The use of this weight is evidently to oblige the yarn to take a proper degree of twist, and not run into kinks.

A cord, or line, made in this way, has always some tendency to twist a little more. However little friction there may be in the loper, there is some, so that the turns which the cord has made in the laying are not enough to balance completely the elasticity of the yarns; and the weight being appended, causes the strands to be more nearly in the direction of the axis, in the same manner as it would stretch and untwist a little any rope to which it is hung. On the whole, however, the twist of a laid line is permanent, and not like that upon thread doubled or thrown in a mill, which remains only in consequence of the great softness and flexibility of the yarn.

The process for laying or closing large cordage is considerably different from this. The strands of which the rope is composed consist of many yarns, and require a considerable degree of hardening. This cannot be done by a whirl driven by a wheel-band; it requires the power of a crank turned by the hand. The strands, when properly hardened, become very stiff, and when bent round the top, are not able to transmit force enough for laying the heavy and unpliant rope which forms beyond it. The elastic twist of the hardened strands must, therefore, be assisted by an external force. All this requires a different machinery and a different process.

At the upper end of the walk is fixed up the tackle-board, fig. 215. This consists of a strong oaken plank called a breast-board, having three or more holes in it, such as A, B, C, fitted with brass or iron plates. Into these are put iron cranks, called heavers, which have hooks or forelocks, and keys, on the ends of their spindles. They are placed at such a distance from each other, that the workmen do not interfere with each other while turning them round. This breast-board is fixed to the top of strong posts well secured by struts or braces facing the lower end of the walk. At the lower end is another breast-board fixed to the upright posts of a sledge, which may be loaded with stones or other weights. Similar cranks are placed in the holes of this breast-board. The whole goes by the name of the sledge. The top necessary for closing large cordage is too heavy to be held in the hand: it therefore has a long staff, which has a truck on the end. This rests on the ground; but, even this is not enough in laying great cables. The top must be supported on a carriage, where it must lie very steady, and it needs attendance, because the master workman has sufficient employment in attending to the manner in which the strands close behind the top, and in helping them by various methods. The top is, therefore, fixed to the carriage by lashing its staff to the two upright posts. A piece of soft rope, or strap, is attached to the handle of the top by the middle, and its two ends are brought back and wrapped several times tight round the rope, in the direction of its twist, and bound down. This is shown at W, and it greatly assists the laying of the rope by its friction. This both keeps the top from flying too far from the point of union of the strands, and brings the strands more regularly into their places.

The first operation is warping the yarns. At each end of the walk are frames called warping frames, which carry a great number of reels or winches filled with rope-yarn. The foreman of the walk takes off a yarn end from each, till he has made up the number necessary for his rope or strand, and bringing the ends together, he passes the whole through an iron ring fixed to the top of a stake driven into the ground, and draws them through: then a knot is tied on the end of the bundle, and a workman pulls it through this ring till the intended length is drawn off the reels. The end is made fast at the bottom of the walk, or at the sledge, and the foreman comes back along the skain of yarns, to see that none are hanging slacker than the rest. He takes up in his hand such as are slack, and draws them tight, keeping them so till he reaches the upper end, where he cuts the yarns to a length, again adjusts their tightness, and joins them all together in a knot, to which he fixes the hook of a tackle, the other block of which is fixed to a firm post, called the warping-post. The skain is well stretched by this tackle, and then separated into its different strands. Each of these is knotted apart at both ends. The knots at their upper ends are made fast to the hooks of the cranks in the tackle-board; and those at the lower ends are fastened to the cranks in the sledge. The sledge itself is kept in its place by a tackle, by which the strands are again stretched in their places, and every thing adjusted, so that the sledge stands square on the walk, and then a proper weight is laid on it. The tackle is now cast off, and the cranks are turned at both ends, in the contrary direction to the twist of the yarns. (In

some kinds of cordage the cranks are turned the same way with the spinning twist). By this the strands are twisted and hardened up; and as they contract by this operation, the sledge is dragged up the walk. When the foreman thinks the strands sufficiently hardened, which he estimates by the motion of the sledge, he orders the heavers at the cranks to stop. The middle strand at the sledge is taken off from the crank. This crank is taken out, and a stronger one put in its place at. The other strands are taken off from their cranks, and are all joined on the hook which is now in the middle hole. The top is then placed between the strands, and being pressed home to the point of their union, the carriage is placed under it, and it is firmly fixed down. Some weight is taken off the sledge. The heavers now begin to turn at both ends. Those at the tackle-board continue to turn as they did before; but the heavers at the sledge turn in the opposite direction to their former motion, so that the cranks at both ends are now turning one way. By the motion of the sledge-crank the top is forced away from the knot, and the rope begins to close. The heaving at the upper end restores to the strand the twist which they are constantly losing by the laying of the rope. The workmen judge of this by making a chalk mark on intermediate points of the strands, where they lie on the stakes which are set up along the walk for their support. If the twist of the strands is diminished by the motion of closing, they will lengthen, and the chalk mark will move away from the tackle-board; but if the twist increases by turning the cranks at the tackle-board, the strands will shorten, and the mark will come nearer to it.

As the closing of the rope advances, the whole shortens, and the sledge is dragged up the walk. The top moves faster, and at last reaches the upper end of the walk, the rope being now laid. In the meantime, the sledge has moved several fathoms from the place where it was when the laying began.

These motions of the sledge and top must be exactly adjusted to each other. The rope must be of a certain length. Therefore the sledge must stop at a certain place. At that moment the rope should be laid; that is, the top should be at the tackle-board. In this consists the address of the foreman. He has his attention directed both ways. He looks at the strands, and when he sees any of them hanging slacker between the stakes than the others, he calls to the heavers at the tackle-board to heave more upon that strand. He finds it more difficult to regulate the motion of the top. It requires a considerable force to keep it in the angle of the strands, and it is always disposed to start forward. To prevent or check this, some straps of soft rope are brought round the staff of the top, and then wrapped several times round the rope behind the top, and kept firmly down by a lanyard or bandage, as is shown in the figure. This both holds back the top, and greatly assists the laying of the rope, causing the strands to fall into their places, and keep close to each other, which is sometimes very difficult, especially in ropes composed of more than three strands. It will greatly improve the laying the rope, if the top has a sharp, smooth, tapering pin of hard wood, pointed at the end, projecting so far from the middle of its smaller end, that it gets in between the strands which are closing. This supports them, and makes their closing more gradual and regular. The top, its notches, the pin, and the warp or strap, which is lapped round the rope, are all smeared with grease or soap to assist the closing. The foreman judges of the progress of closing chiefly by his acquaintance with the walk, knowing that when the sledge is abreast of a certain stake, the top should be abreast of a certain other stake. When he finds the top too far down the walk, he slackens the motion at the tackle-board, and makes the men turn briskly at the sledge. By this the top is forced up the walk, and the laying of the rope accelerates, while the sledge remains in the same place, because the strands are loosing their twist, and are lengthening, while the closed rope is shortening. When, on the other hand, he thinks the top too far advanced, and fears that it will be at the head of the walk before the sledge has got to its proper place, he makes the men heave briskly on the strands, and the heavers at the sledge-crank work softly. This quickens the motion of the sledge by shortening the strands; and by thus compensating what has been overdone, the sledge and top come to their places at once, and the work appears to answer the intention.

When the top approaches the tackle-board, the heaving at the sledge could not cause the strands immediately behind the top to close well, without having previously produced an extravagant degree of twist in the intermediate rope. The effort of the crank must therefore be assisted by men stationed along the rope, each furnished with a tool called a woolder. This is a stout oak stick, about three feet long, having a strap of soft rope-yarn or cordage fastened on its middle or end. The strap is wrapped round the laid rope, and the workman works with the stick as a lever, twisting the rope round in the direction of the crank's motion. The woolders should keep their eye on the men at the crank, and make their motion correspond with his. Thus they send forward the twist produced by the crank, without either increasing or diminishing it, in that part of the rope which lies between them and the sledge.

Such is the general and essential process of rope-making. The fibres of hemp are twisted into yarns, that they may make a line of any length, and stick among each other with a force equal to their own cohesion. The yarns are made into cord of permanent twist by laying them; and that we may have a rope of any degree of strength, many yarns are united in one strand, for the same reason that many fibres were united in one yarn; and in the course of this process it is in our power to give the rope a solidity and hardness which make it less penetrable by water, which would rot it in a short while. Some of these purposes are inconsistent with others; and the skill of a rope-maker lies in making the best compensation, so that the rope may on the whole be the best in point of strength, pliancy, and duration, that the quantity of hemp in it can produce.

The following rule for judging of the weight which a rope will bear is not far from the truth. It supposes them rather too strong; but it is so easily remembered that it may be of use.

Multiply the circumference in inches by itself, and take the fifth part of the product, it will express the tons which the rope will carry. Thus, if the rope has 6 inches circumference, 6 times 6 is 36, the fifth of which is $7\frac{1}{5}$ tons; apply this to the rope of $3\frac{1}{2}$, on which sir Charles Knowles made his experiments $3\frac{1}{2} \times 3\frac{1}{2} = 10{,}25\frac{1}{2}$ of which is 2,05 tons, or 4592 pounds. It broke with 4550.

This may suffice for an account of the mechanical part of the manufacture. But we have taken

no notice of the operation of tarring; and our reason was, that the methods practised in different rope-works are so exceedingly different, that we could hardly enumerate them, or even give a general account of them. It is evidently proper to tar in the state of twine or yarn, this being the only way that the hemp could be uniformly penetrated. The yarn is made to wind off one reel, and having passed through a vessel containing hot tar, it is wound up on another reel; and the superfluous tar is taken off by passing through a hole surrounded with spongy oakum; or it is tarred in skains or hauls, which are drawn by a capstern through the tar-kettle, and through a hole formed of two plates of metal, held together by a lever loaded with a weight.

It is established beyond a doubt, that a tarred cordage when new is weaker than white, and that the difference increases by keeping. The following experiments were made by Mr. Du Hamel at Rochefort on cordage of three inches (French) in circumference, made of the best Riga hemp.

White.	Tarred.
August 8, 1741.	
Broke with 4500 pounds.	3400 pounds.
4900	3300
4800	3250
April 25, 1743.	
4600	3500
5000	3400
5000	3400
Sept. 3, 1746.	
3800	3000
4000	2700
4200	2800

A parcel of white and tarred cordage was taken out of a quantity which had been made February 12, 1746. It was laid up in the magazines, and comparisons were made from time to time as follows:

White bore.	Tarred bore.	Differ.
1746, April 14, 2645 lbs.	2312 lbs.	333
1747, May 18, 2762	2155	607
1747, Oct. 21, 2710	2050	660
1748, June 19, 2575	1752	823
1748, Oct. 2, 2425	1837	588
1749, Sept. 25, 2917	1865	1052

Mr. Du Hamel says, that it is decided by experience, 1. That white cordage in continual service is one-third more durable than tarred. 2. That it retains its force much longer while kept in store. 3. That it resists the ordinary injuries of the weather one-fourth longer.

We know this one remarkable fact: in 1758 the shrowds and stays of the Sheer hulk at Portsmouth dock-yard were over-hauled, and when the worming and service were taken off, they were found to be of white cordage. On examining the store-keeper's books, they were found to have been formerly the shrowds and rigging of the Royal William, of 110 guns, built in 1715, and rigged in 1716. She was thought top-heavy, and unfit for sea, and unrigged, and her stores laid up. Some few years afterwards, her shrowds and stays were fitted on the Sheer hulk, where they remained in constant and very hard service for about 30 years, while every tarred rope about her had been repeatedly renewed.

Why then do we tar cordage? It is chiefly serviceable for cables and ground tackle, which must be continually wetted, and even soaked. The result of careful observation is, 1. That white cordage, exposed to be alternately very wet and dry, is weaker than tarred cordage. 2. That cordage which is superficially tarred is constantly stronger than what is tarred throughout, and it resists better the alternatives of wet and dry. The shrowds of the Sheer hulk were well tarred and blacked, so that it was not known that they were of white cordage.

Attempts have been made to increase the strength of cordage by tanning. But although it remains a constant practice in the manufacture of nets, it does not appear that much addition, either of strength or durability, can be given to cordage by this means. The trial has been made with great care, and by persons fully able to conduct the process with propriety. But it is found that the yarns take so long time in drying, and are so much hurt by drying slowly, that the room required for a considerable rope-work would be immense, and the improvement of the cordage is but trifling, and even equivocal.

ROʹPEDANCER. *s.* (*rope* and *dancer.*) An artist who dances on a rope (*Wilkins*).

ROʹPEMAKER, or *Roper. s.* (*rope* and *maker.*) One who makes ropes to sell (*Shakspeare*).

ROʹPERY. *s.* (from *rope.*) Rogue's tricks (*Shakspeare*).

ROʹPETRICK. *s.* (*rope* and *trick.*) Probably rogue's tricks; tricks that deserve the halter (*Shakspeare*).

ROʹPINESS. *s.* (from *ropy.*) Viscosity; glutinousness.

ROʹPY. *a.* (from *rope.*) Viscous; tenacious; glutinous (*Dryden*).

ROQUEFORT CHEESE; a cheese of a peculiar character and beautiful marble blue colour, obtained from the milk of goats and sheep. These animals are grazed for this purpose in the election of Milhaud in France, on a rich, fertile, and extensive plain, ten leagues in diameter, called the Larzac, and the cheese derives its distinctive name from that of the town to which it is chiefly carried from the adjoining farms for sale. It is often variable in its quality, which M. Chaptal attributes to a difference it undergoes in the first processes of its manufactory. When the quality, however, is of an inferior kind, he ascribes it, with Huzard, to the rennet. He thinks that the variable nature of this material, the delay of the milk in the stomach, the variable quality of the curd, the more or less perfect mixture of the gastric juice with the food, the gastric juice itself, and even the age, constitution, and temperament of the animal, all produce a greater or less degree of influence.

The character of this cheese when perfect, is mildness, whiteness, firmness, an agreeable taste, and colour marbled with blue. It soon, however, changes its quality, from change of temperature and transportation; and so nice is its point of excellence, that the connoisseurs have concurred in opinion that it can only be had in perfection at Roquefort. The first degrees of fermentation when in curd make it insensibly lose the mild and insipid taste it possesses before the fermentation takes place, and at last it contracts a sharp disagreeable savour; between these extremes therefore the fermentation must be stopped. It is also necessary to attend to its changes after having

been salted and placed in the cellars. It is first covered with a white down, which afterwards becomes blue, and then red. These colours arise from the attraction of oxygen, which, by producing a different density, or otherwise changing the position of the particles, enables them to refract particular rays, according to their respective power of refraction: as the blue ray is the weakest, this is the first reflected when the oxygen gass is fixed in a body during the fermenting process. The red which succeeds the blue proceeds from a further application of the same principle, and so of the rest. It is from this red colour that the judges determine the perfection of the cheese.

RO'QUELAURE. *s.* (French.) A cloak for men (*Gay*).

ROQUET. See ROCKET.

RORATION. *s.* (*roris*, Latin.) A falling of dew.

RO'RID. *s.* (*roridus*, Lat.) Dewy (*Brown*).

RORIDULA, in botany, a genus of the class pentandria, order monogynia. Corol five-petalled; calyx five-leaved; capsule three-valved; anthers bag-shaped at the base. One species; a Cape plant, with shrubby stem; leaves subulate, ciliate; the whole plant viscid with glandular hairs.

RORI'FEROUS. *a.* (*ros* and *fero*, Latin.) Producing dew.

RORI'FLUENT. *a.* (*ros* and *fluo*, Latin.) Flowing with dew.

ROS CALABRINUS. The officinal manna is sometimes so termed.

ROS SOLIS. (*ros*, *roris*, dew.) Rosella. Sun dew. This elegant little plant, drosera rotundifolia scapis radicatis; foliis orbiculatis of Linnéus, is said to be so acrid as to ulcerate the skin, and remove warts and corns, and to excite a fatal coughing and delirium in sheep who eat it. It is seldom given medicinally in this country but by the lower orders, who esteem a decoction of it as serviceable in asthmas and coughs.

ROSA. Rose. In botany, a genus of the class icosandria, order polygynia. Calyx arm-shaped, fleshy, contracted at the orifice, terminating in five segments; petals five; seeds numerous, bristly, fixed to the inside of the calyx. Thirty-eight species, scattered over the globe; six indigenous to our own country. Of these, some have their fruit nearly globular, others ovate. The different species run so closely into each other, that it is difficult to determine between species and varieties; whence some botanists resolve the whole into the single species of rosa canina, or dog-rose, believing all others to be varieties of this alone. The cultivated species are as follow:

1. R. lutea. Single yellow rose.

2. R. sulphurea. Double yellow rose. Probably only a variety of the preceding.

3. R. blanda. Hudson's Bay rose. Unarmed, when full grown, but possessing prickles when young; branches round, shining, reddish.

4. R. cinnamomea. Cinnamon rose. Roses single, largish, of a pale colour; armed with great thorns: somewhat resembling the eglantine.

5. R. arvensis. White dog-rose. Smaller than the common dog-rose, and the flower never otherwise than white.

6. R. pimpinellifolia. Small burnet-tree rose. Flowers white; segments of the calyx entire.

7. R. spinosissima. Scotch rose. Slender, numerous, unequal needle-like prickles on the branches; petals white or cream-coloured, yellow at the base, delicately fragrant, sometimes striped with red. It has several varieties.

8. R. parviflora. Small-flowered American rose. Corol single, of a pale reddish colour. It has a variety with a double flower.

9. R. lucida. Shining-leaved American rose. Flowers bright red, single, with little scent.

10. R. Carolina. Carolina rose. Five or six feet high; petals obcordate, red. Flowers late in the summer.

11. R. villosa. Apple-rose. Taller than the last; leaves fragrant when rubbed; corol full rose-colour, not very fragrant: the fruit globular, larger than any of the other sorts, bristly and blood red, and surrounded with a pleasant acid pulp, which is sometimes made into conserves and sweetmeats, like that of rosa canina. A native of our own woods.

12. R. Provincialis. Provence rose. Well known, and one of the most beautiful species: the flowers are sometimes very large, and the petals closely folded over each other like cabbages, whence it is also called cabbage rose; the corol has the most fragrant odour of all the sorts. The varieties are very numerous.

13. R. centifolia. Hundred-leaved rose. Fruit, peduncles, petioles and stem bristly; leaflets ovate, hairy underneath: flowers very double, and of a deep red, but of small scent. Supposed to be a native of China. Varieties very numerous.

14. R. Gallica. Red rose. Flowers large, but not very double; spread open wide, and decay soon; when well dried, will hold their colour and scent longer than most other species. It has many varieties.

The flowers are valued for their adstringent qualities, which are most considerable before the petals expand; and therefore in this state they are chosen for medicinal use, and ordered by the pharmacopœias in different preparations, as those of a conserve, a honey, an infusion, and a syrup. The infusion of roses is a grateful cooling subadstringent, and useful in hæmoptysis, and other hæmorrhagic complaints; its efficacy, however, depends chiefly on the acid.

15. R. Damascena. Damask rose. Prickly stalks eight or ten feet high; peduncles with prickly hairs; calyxes hairy; corol soft, pale red, not very double, but of an agreeable odour. A native of the south of France.

The pharmacopœias direct a syrup to be prepared from the petals of this rose which is found to be a pleasant and useful laxative for children, or to obviate costiveness in adults.

Most of the roses, though much cultivated in our gardens, are far from being distinctly characterised. Those denominated varieties are extremely numerous, and often permanently uniform; and the specific differences, as hitherto pointed out, are in many respects so adequate to the purpose of satisfactory discrimination, that it becomes a difficult matter to distinguish which are species, and which are varieties only. The London College, following Gerard and Parkinson, has still retained the name rosa damascena; but the damask rose is another species, widely different from the centifolia, as appears from the description given of it by Du Roi and Miller.

The petals are directed for medicinal use: they are of a pale red colour, and of a very fragrant odour, which to most people is extremely agreeable; and therefore this and most of the other roses are much used as nosegays. We may remark, however, that in some instances they have, under certain circumstances, produced alarming symptoms. The petals "impart their odorous matter to watery liquors, both by infusion and distillation. Six pounds of fresh roses impregnate, by distillation, a gallon or more of water strongly with their fine flavour. On distilling large quantities, there separates from the watery fluid a small portion of a fragrant butyraceous oil, which liquifies by heat, and appears yellow, but concretes in the cold into a white mass. An hundred pounds of the flowers, according to the experiments of Tachenius and Hoffman, afforded scarcely half an ounce of oil." The smell of the oil exactly resembles that of roses, and is therefore much used as a perfume. It possesses very little pungency, and has been highly recommended for its cordial and analeptic qualities. These flowers also contain a bitterish substance, which is extracted by water along with the odorous principle, and remains entire in the decoction after the latter has been separated by distillation or evaporation.

This fixed sapid matter of the petals manifests a purgative quality; and it is on this account that the flowers are received in the Materia Medica.

16. R. sempervirens. Ever-green rose. Slender stalks that trail on the ground unless supported: leaves perennial; flowers small, single, white, of a musky odour. Germany.

17. R. pumila. Dwarf Austrian rose. Branches with great abundance of prickles, which fall off on the stems; fruit large, pear-shaped.

18. R. turbinata. Frankfort rose. Nearly unarmed; fruit large; flowers thick, and double as the red rose, swelling so strongly in the bud that the latter often breaks before the corol is full blown; colour pale red, with a hard umbone of yellow threads in the middle.

19. R. rubinosa. Sweet-briar. Eglantine. Well known, and possessing many varieties from duration of the leaf or colour of the flower.

20. R. muscosa. Moss rose. Petioles, peduncles, calyx, and branchlets thickly covered with viscid glandular moss: flower of an elegant crimson, and most agreeable odour: native soil doubtful.

21. R. moschata. Musk rose. Ten or twelve feet high; armed; flowers in large branches, umbelled, terminal, white, of a fine musky odour. Stalks too weak to support themselves. A variety with double flowers. A native of Barbary.

22. R. Alpina. Alpine rose. Low shrub, lower half armed; petioles hispid; flowers solitary, red, middle-sized.

23. R. semperflorens. Deep-red China rose. Shrub three feet high; flowers large in proportion to the plant, semidouble, dark-red and very richly so, extremely fragrant, coming out in succession during the greater part of the year, but more sparingly in the winter months. A native of China.

24. R. alba. White rose. Fruit ovate, glabrous; peduncles bristly; stem and petioles prickly. A native of Europe.

25. R. canina. Dog-rose. Hip or Hep-tree. Found wild in our hedges, both red-flowered and white-flowered; fruit surrounded with a pleasant acid pulp, admitted into the Materia Medica on this account, and prepared with sugar in the form of a conserve. See the article CYNOSBATUS, under which name it is generally described in the pharmacopœias.

All these, whether indigenous or of foreign origin, are propagated either by suckers, by layers, or by budding them on the other sorts of roses; the last method is but seldom practised, but is necessary for the finer sorts, which do not naturally shoot vigorously, and which produce few or no suckers. The best sort of rose for stocks is the Frankfort kind; the season for doing it is in June, and there must be great care taken afterwards, that the stalk produce no suckers at the bottom, for these would soon starve the bud.

When roses are to be propagated from suckers, they are to be taken off annually, and planted into nursery beds, or into the places where they are to remain. They always take root well the first year, but if suffered to remain on the stock longer, they grow woody, and often fail. But the best method of obtaining vigorous plants is, by laying down the shoots; this is to be done in autumn, and by the autumn following they will have taken root so well, that they may be taken off from the old plant, and removed to the places where they are to remain. These may be transplanted any time from October to April, but the earlier the better. Roses, in general, delight in a rich moist soil, and an open situation, in which they will produce great quantity of flowers, and those much more beautiful than when they are on a dry soil, and shady situation. All the pruning they require is, to have their dead wood cut, and their suckers taken away every autumn; and if there are any very luxuriant branches, they may be shortened, and the doing this will supply the other parts of the tree with fresh wood.

ROSA (Salvator), an admirable painter, born

at Naples in 1614. He was first instructed by Francesco Francazano, a kinsman: but the death of his father reduced him to sell drawings sketched upon paper for any thing he could get; one of which happening to fall into the hands of Lafranc, he took him under his protection, and enabled him to enter the school of Spagnoletto, and to be taught moreover by Daniel Falcone, a distinguished painter of battles at Naples. Salvator had a fertile imagination. He studied nature with attention and judgment; and always represented her to the greatest advantage: for every tree, rock, cloud, or situation, that enters into his composition, shows an elevation of thought that extorts admiration. He was equally eminent for painting battles, animals, sea or land storms; and he executed these different subjects in such taste as renders his works readily distinguishable from all others. His pieces are exceedingly scarce and valuable; one of the most capital is that representing Saul and the witch of Endor, which was preserved at Versailles. He died in 1673; and as his paintings are in few hands, he is more generally known by his prints; of which he etched a great number. He painted landscapes more than history; but his prints are chiefly historical. The capital landscape of this master at Chiswick is a noble picture. However, he is said to have been ignorant of the management of light, and to have sometimes shaded faces in a disagreeable manner. He was however a man of undoubted genius; of which he has given frequent specimens in his works. A roving disposition, to which he is said to have given full scope, seems to have added a wildness to all his thoughts. We are told that he spent the early part of his life in a troop of banditti; and that the rocky desolate scenes in which he was accustomed to take refuge furnished him with those romantic ideas in landscape, of which he is so exceedingly fond, and in the description of which he so greatly excels. His *robbers*, as his detached figures are commonly called, are supposed also to have been taken from the life.

Salvator Rosa is sufficiently known as a painter; but until lately we never heard of him as a musician. Among the musical manuscripts purchased at Rome by Dr. Burney was a music-book of Salvator, in which are many airs and cantatas of different masters, and eight entire cantatas written, set, and transcribed by this celebrated painter himself. From the specimen of his talents for music here given, we make no scruple of declaring, that he had a truer genius for this science, in point of melody, than any of his predecessors or contemporaries: there is also a strength of expression in his verses, which sets him far above the middle rank as a poet. Like many other artists of real original merit, he complains of the ill usage of the world, and the difficulty he finds in procuring a bare subsistence.

ROSACEA. See GUTTA ROSACEA.

ROSACEOUS, among botanists, an appellation given to such flowers as are composed of several petals or leaves disposed in a sort of circular form, like those of a rose.

ROSALIA. A term applied by the Italians to the repetition of a musical passage one note higher. A resource very tiresome in its effect when injudiciously introduced, but capable of greatly heightening the melody when dictated by taste, and sanctioned by judgment.

ROSARY, in the Romish church, a chaplet consisting of five or fifteen decads of beads, to direct the recitation of so many Ave Maria's, in honour of the Virgin.

ROSARY also denotes a particular mass or form of devotion addressed to the Virgin, to which the chaplet of that name is accommodated. It consists of fifteen repetitions of the Lord's prayer, and an hundred and fifty salutations of the blessed Virgin; whilst the crown, as it is called, according to the different opinions of the learned concerning the age of the Virgin, consists of six or seven repetitions of the Lord's prayer, and six or seven times ten salutations or Ave Maria's.

Some attribute the institution of the rosary to St. Dominic; but F. d'Achery shews it was in use in the year 1100; so that St. Dominic could only make it more celebrated. Others attribute it to Paulus Libycus, and others to St. Benedict; others to the Chartreux; others to Venerable Bede; and, finally, others to Peter the Hermit. Those who ascribe it to St. Dominic, differ as to the particular time of its institution; some referring it to the year 1208, when he preached against the Albigenses; others will have him to have set it on foot in the course of his missions in Spain, before he passed into France.

ROSARY (Order of the), or of our Lady of the Rosary, is an order of knights, supposed by Schoonebeck, and the Jesuit Bonanni, to have been instituted by St. Dominic; but by mistake; for that saint never instituted any order under this name, and these authors apparently make a military order of an army of croisees, who, under the command of the count de Montfort, fought against the Albigenses.

ROSBACH, a town of Germany, in Saxony, famous for a victory obtained here by the king of Prussia over the French, on November 5, 1757, in which 10,000 of the French were killed or taken prisoners, with the loss of no more than 500 Prussians.

ROSCHILD, a town of Denmark, in the isle of Zealand, with a bishop's see and a small university. It is famous for a treaty concluded here in 1658; and in the great church there are several tombs of the kings of Denmark. It is seated at the bottom of a small bay. Lon. 12. 20 E. Lat. 55. 40 N.

RO'SCID. *a.* (*roscidus*, Latin.) Dewy; abounding with dew; consisting of dew (*Bacon*).

ROSCIUS, a celebrated Roman actor. His eyes were naturally distorted, and he always appeared on the stage with a mask, but the Romans overlooked the deformities of his face, that they might the better hear his elegant pronunciation, and the sweetness of his voice.

He was accused of murder; but Cicero undertook his defence, and cleared him of the aspersion in an oration still extant. Roscius wrote a treatise, in which he compared, with much judgment and learning, the profession of the orator with that of the comedian. He died about sixty years before Christ.

ROSCOMMON, a county of Ireland, in the province of Connaught, 50 miles long and 28 broad; bounded on the E. by Longford and W. Meath, on the N. by Sligo and Leitrim, on the S. by Galway, and on the W. by Galway and Mayo. It is a level fruitful country, and by the help of good husbandry yields excellent corn. It contains 59 parishes, and sends eight members to parliament.

ROSCOMMON, a borough of Ireland, in a county of the same name, with a sessions-house and a gaol, 80 miles W. of Dublin. Lon. 8. 2 W. Lat. 53. 34 N.

ROSCOMMON (Wentworth Dillon, earl of), a British poet, born in Ireland in 1633. He was brought up in England, but the commotions of the times, and the impeachment of his uncle, lord Stafford, drove him to Caen, where he finished his education under Bochart. At the restoration he came to England, where he was made by Charles II. captain of the band of pensioners. He nearly ruined himself by gaming, and by the vicious indulgences prevalent at a corrupted court; but when master of horse to the duchess of York, he married Frances, daughter of lord Burlington, and devoted himself to literature and poetry, and planned with Dryden a design to fix and refine the English language. He died of the gout, improperly treated by a French empiric, 1684. His poems are few, and of those the best are, his essay on translated verse—and his translation of Horace's art of poetry. Though perhaps not a sublime poet, he certainly is a correct one, and he has the singular merit of being the only moral writer among that class in Charles's days.

ROSE, in botany. See ROSA.

ROSE OF JERICHO, in botany. See ANASTATICA.

ROSE (Rock), in botany. See CISTUS.

ROSE (Root), in botany. See RHODIOLA.

ROSE (Bay), in botany. See NERIUM.

ROSE (Dwarf Bay), in botany. See RHODODENDRON.

ROSE (Mountain), in botany. See RHODODENDRON.

ROSE (Willow herb), in botany. See EPILOBIUM.

ROSE (Campion), in botany. See AGROSTEMMA.

ROSE (China), in botany. See HIBISCUS.

ROSE (Christmas), in botany. See HELLEBORUS.

ROSE (Corn), in botany. See PAPAVER.

ROSE (Guelder), in botany. See VIBURNUM.

ROSE (Japan), in botany. See CAMELLIA.

ROSE (Mallow), in botany. See ALCEA.

ROSES (Ottar of), the fine essential oil of the flower whose name it bears. This is an Arabic and Persian term, and is probably derived from the same source as the Latin *odor*, with which it is synonymous if not univocal.

Roses are capable of communicating a very elegant and exquisite perfume in various ways. The more common is by distillation, which is sometimes effected with the dry, but more generally with the moist corol. If with the former, the flowers should be macerated in water for a few hours antecedently to the process; after which they are to be introduced into a tinned copper still or alembic, and rammed down till it is as full as it can hold; a sufficient quantity of water is then to be poured upon them to cover them; the head luted on, the refrigeratory filled with cold water, and the fire lighted, and so regulated as to keep the contents of the still constantly simmering, but scarcely boiling. The steam being condensed in the worm, will form a small current of water, and is to be collected in proper vessels till it comes off nearly insipid, when the distillation is to be stopped: and the produce will be common rose-water.

If the odour be required of a fuller and more exquisite degree, the distillation must be repeated; the water obtained by the first process being poured, instead of fresh spring water, upon another collection of rose-petals, as in the former instance, and whatever deficiency there may be must be supplied by spring-water; and for a still more exalted perfume a third, fourth, or even further distillation may be persevered in; in consequence of which the amount of essential oil yielded by equal quantities of the same substance will form a constantly increasing series, till the whole of the water drawn off by such repeated distillations becomes at length completely saturated with oil. And hence the cause of that difference which is observed in the fragrance of rose or other perfumed waters obtained by different chemists; for Bindheim has satisfactorily shown that it is not till the seventh, nor even, in some instances, till the tenth distillation that the produce of the spiritus rector or aromatic principle attains its maximum.

In the ottar of roses, however, we possess this aromatic principle or essential oil without any mixture with water; and the process for obtaining this delicious and costly purfume in India is thus conducted, and bears a near analogy to that by which vegetable butters in general are separated from the other parts of the plant. A clean cask or large glazed earthen jar is filled with rose leaves carefully separated from the calyxes, and spring-water is poured upon them just sufficiently to cover them; after which the vessel, with its contents, is set in the sun for two or three days and taken under cover during the night. At the end of the third or fourth day small particles of yellow oil will be seen floating on the surface of the water, which in the course of a week will have increased to a thin scum. This scum is the

ottar of roses: it is taken up by a little cotton tied to the end of a stick, and squeezed into a phial.

This is the common mode; but it may be obtained, as may also the oils that exist in the fragrant blossoms of the violet, mignonette, jasmine, tuberose, hyacinth, and all the scented liliaceous plants, whose odorous principle is exceedingly minute in quantity, and so evaporable as to be instantly destroyed by heat, by means of the oil of ben, for whose production and properties we refer the reader to the article OILS, ESSENTIAL. For which purpose layers of cotton soaked in oil of ben are to alternate with layers of any of the preceding flowers in a large covered dish; which, after it has been set in hot water or exposed to the action of the sun for a few days, is to have its contents unpacked, when the oil is to be squeezed out of the cotton, and will be found highly impregnated with the aromatic principle of the flower made use of.

If it be desired to separate this principle, or rather the oil in which it is lodged, from the oil of ben with which it is now combined, the following process should be adopted. Let a phial be half filled with a mixture of alkohol and the perfumed oil in equal proportions, and shaken for a few minutes, that every particle of each may come in contact with the other: then pour off the alkohol from the oil, which will be found to be nearly inodorous, the fragrant principle being yielded to the former. Let this perfumed spirit be shaken with successive portions of oil till the richness of its fragrance is not sensibly increased, and then pour it into a bason containing two or three times its bulk of pure water: the water and alkohol will combine together; and the greater part of the essential oil will be liberated and will float at the top of the liquor, from which it may be scummed off by a little cotton. The liquor being afterwards submitted to a very gentle distillation, the first portion of spirit that comes over will be found to be still very fragrant, and may be employed, mixed with fresh alkohol, in treating other portions of scented oil.

ROSE-WOOD. See RHODIUM LIGNUM.

ROSE-WORT. See RHODIA.

To speak under the ROSE. To speak any thing with safety, so as not afterward to be discovered (*Brown*).

ROSE. The preterit of *rise*.

ROSE CASTLE, in Cumberland, a seat of the bishop of Carlisle, situate on the river Caude, near Inglewood Forest. It was burnt down in the civil wars; but has since by several of its bishops been restored, though perhaps not to that magnificence which it had when Edward I. lodged here, in his expedition to Scotland.

ROSEBAY WILLOW HERB. The epilobium angustifolium of Linnéus, common in our woods in moist situations. The young shoots are said to be little inferior to asparagus when boiled.

RO'SEATE. *a.* (from *rose*.) 1. Rosy; full of roses (*Pope*). 2. Blooming, fragrant, purple, as a rose.

RO'SED. *a.* (from the noun.) Crimsoned; flushed (*Shakspeare*).

ROSEMARY. See ROSMARINUS.

ROSEMARY (Wild). See LEDUM.

ROSENIA, in botany, a genus of the class syngenesia, order polygamia superflua. Receptacle chaffy; down capillary and chaffy; calyx imbricate, scarious. One species; a Cape plant, with branchy flexuous stem and solitary flowers.

ROSES, a seaport of Spain, in Catalonia, with a citadel, seated on the bay of Roses, in the Mediterranean, 15 miles N.E. of Gironna. It was taken by the French in 1693 and in 1795.

ROSETTO, a town of Egypt, seated on the west branch of the Nile. The Egyptians call it Raschid, and account it one of the pleasantest places in the country. It has a great manufacture of striped and other coarse linens; but its chief business is the carriage of goods hence to Cairo; for all European merchandise is brought hither from Alexandria by sea, and carried hence by boats to Cairo. The Europeans have their viceconsuls and factors here. It is 25 miles N.E. of Alexandria, and 100 N.W. of Cairo. Lon. 30. 45 E. Lat. 31. 30 N.

ROSICRUCIANS, or Brothers of the Rosy-cross, a name assumed by a sect or cabal of hermetical philosophers; who arose, as it has been said, or at least became first taken notice of, in Germany, in the beginning of the fourteenth century.

They bound themselves together by a solemn secret, which they all swore inviolably to preserve; and obliged themselves, at their admission into the order, to a strict observance of certain established rules.

They pretended to know all sciences, and chiefly medicine: whereof they published themselves the restorers. They pretended to be masters of abundance of important secrets; and among others, that of the philosophers stone; all which they affirmed to have received by tradition from the ancient Egyptians, Chaldeans, the Magi, and Gymnosophists.

Their chief was a German gentleman, called Christian Rosencruz, educated in a monastery, where he learned the languages About the close of the fourteenth century, he went to the Holy Land, where falling sick, at Damascus, he consulted the Arabs, and other eastern philosophers, by whom he was supposed to be initiated into this wonderful art. At his return into Germany, he formed a society, to whom he communicated the secrets he had brought with him out of the east, and finally died in 1484. The whole of this account is generally rejected as fabulous.

They have been distinguished by several names, accommodated to the several branches of their doctrine.

Because they pretend to protract the period of human life, by means of certain nostrums, and even to restore youth, they were called immortales.

As they pretended to know all things, they

have been called illuminati: and because they have made no appearance for several years, but have kept altogether incognito, they have been called the invisible brothers.

Their society is frequently signed by the letters F. R. C. which some among them interpret *fratres roris cocti*; it being pretended, that the matter of the philosophers stone is dew concocted, exalted, &c.

At the head of these fanatics were Robert Fludd, an English physician, Jacob Behmen, and Michael Mayer. The common principles, which serve as a kind of centre of union to the Rosicrucian society, are the following. They all maintain, that the dissolution of bodies, by the power of fire, is the only way by which men can arrive at true wisdom, and come to discern the first principles of things. They all acknowledge a certain analogy and harmony between the powers of nature and the doctrines of religion, and believe that the deity governs the kingdom of grace by the same laws with which he rules the kingdom of nature; and hence they are led to use chemical denominations to express the truths of religion. They all hold, that there is a sort of divine energy, or soul, diffused through the frame of the universe, which some call the argheus, others the universal spirit, and which others mention under different appellations. They all talk in the most superstitious manner of what they call the signatures of things, of the power of the stars over all corporeal beings, and their particular influence upon the human race, of the efficacy of magic, and the various ranks and orders of demons. In fine, they all agree in throwing out the most crude incomprehensible notions and ideas, in the most obscure, quaint, and unusual expressions. Mosh. Eccl. Hist. vol. iv.

ROSIENNE, a town of Samogitia, seated on the Dubisse, 70 miles S. of Mittau, and 188 N.E. of Warsaw. Lon. 23. 45 E. Lat. 55. 30 N.

ROSIERS-AUX-SALINES, a town of France, in the department of Meurthe, famous for its salt-works. It is seated on the Meurthe, nine miles S.E. of Nanci, and 170 E. of Paris. Lon. 6. 27 E. Lat. 48. 35 N.

ROSIN. See RESINA.

To RO'SIN. *v. a.* (from the noun.) To rub with rosin (*Gay*).

RO'SINY. *a.* (from *rosin.*) Resembling rosin.

ROSMARINUS. Rosemary. In botany, a genus of the class diandria, order monogynia. Corol unequal, the upper lip two-parted; filaments long, curved, simple, with a tooth. Two species, as follows.

1. R. Chilensis. A native of Chili, with petioled leaves.

2. R. officinalis. Common rosemary. A native of Europe, with sessile leaves. This has two varieties.

α. Silver rosemary, with white-striped leaves.

β. Golden rosemary, with yellow striped leaves.

Both varieties grow wild in the south of France, and in Spain and Italy, on rocks near the sea, where they multiply prodigiously. With us they grow the most vigorously on a moist, rich soil, but they are much sweeter scented when on a poor soil, and on such they bear the severity of our seasons much better than where they grow more freely. They are all propagated by planting slips, or cuttings of them, in the spring of the year, on a bed of light fresh earth; and when they are rooted, they are to be removed into the places where they are to remain. The best season for doing this is in August; if they are planted later than this, they seldom live through the winter; therefore such as are not transplanted at this time should be left till the following spring, when March is a very good time for removing them; and if this be done in showery weather, they take root almost immediately. The plants are sometimes killed in cold winters in our gardens, but when by accident they have rooted themselves in an old wall, as is often the case, they stand all weathers unhurt, which is owing to their being stinted and their roots dry.

The leaves and tops of this plant have a fragrant aromatic smell, and a bitterish pungent taste. Rosemary is reckoned one of the most powerful of those plants which stimulate and corroborate the nervous system; it has therefore been recommended in various affections supposed to proceed from debility or defective excitement of the brain and nerves, as in certain head-achs, deafness, giddiness, and in some hysterical and dyspeptic symptoms.

ROSOI (Barnaby Firmin du), a writer, born at Paris 1745. He wrote dramatic pieces, acted with applause, but possessing little merit. He was also author of a romance—the annals of Toulouse, &c. but though a voluminous writer, he continued poor. At the revolution he wrote in favour of the unfortunate monarch his gazette, called l'ami du roi, and in consequence of his principles, he was marked for death. In his last moments he wished to benefit mankind by soliciting that his blood might be extracted from his veins, and transfused into the body of an old man, which was rejected. He was executed 1792.

ROSOY, a town of France, in the department of Seine and Marne, with a magnificent castle, 15 miles S. of Meaux. Lon. 2. 59 E. Lat. 48. 40 N.

ROSS, a town in Herefordshire, with a market on Thursday. It owes most of its improvements and charitable institutions to John Kyrle, commonly called the Man of Ross, whose benevolent character is so interestingly delineated by the pen of Pope. It is seated on the Wye, 12 miles S.E. of Hereford, and 115 W. by N. of London. Lon. 2. 25 W. Lat. 51. 56 N.

Ross, a seaport of Ireland, in the county of Cork. It is united to Cork as an episcopal see, and is seated on a bay of the Atlantic, 20 miles S.W. of Kinsale. Lon. 8. 58 W. Lat. 51. 32 N.

Ross (New), a seaport of Ireland, in Wexford, situate on the Barrow, which is navigable

for large vessels up to the quay. The town has a considerable trade, and exports a great quantity of butter and beef. It is 11 miles N.E. of Waterford, and 17 W. of Wexford. Lon. 6. 58 W. Lat. 51. 22 N.

Ross (Alexander), a prelate, born at Aberdeen, 1640, and educated at St. Andrew's. He was in 1686 bishop of Edinburgh; but the revolution put an end to the episcopal authority in Scotland. He died at Edinburgh 1720, aged 80. He was author of some tracts little known.

Ross (Alexander), author of Virgilius evangelizans, a singular canto on the life of Christ, extracted all from Virgil—a view of all religions, in 8vo.—and other tracts, was of Aberdeen, and became master of Southampton school, and chaplain to the first Charles. He died 1654, aged 64.

Ross (John), of Herefordshire, was educated at St. John's college, Cambridge. He obtained Frome vicarage, Somersetshire, and in 1778 was preferred to the see of Exeter. He wrote a defence of Dr. Middleton against Mr. Markland, 1746, and in 1749 edited Cicero's epistles ad familiares, in 2 vols. 8vo. He published besides, single sermons, and died 1792.

ROSSEL, a name for light sand.

ROSSANO, a strong town of Naples, in Calabria Citeriore, and an archbishop's see. The adjacent valleys yield oil, capers, saffron, and excellent pepper. It is seated on an eminence, surrounded by rocks, three miles from the gulf of Tarento, and 136 S.E. of Naples. Lon. 16. 38 E. Lat. 39. 48 N.

ROSSLAU, a town of Upper Saxony, in the principality of Anhalt, with a castle; seated at the conflux of the Rosslau with the Elbe, 10 miles S.S.E. of Zerbst.

ROSS-SHIRE, a county of Scotland, 80 iles long and 70 broad; bounded on the N. by Sutherlandshire and the frith of Dornock, W. by the Minch, S. by Invernessshire, and E. by the frith of Murray and the county of Cromarty, which last it almost incloses. It is divided into 30 parishes, and the number of inhabitants in 1801 was 52,291. The middle and N.W. parts are mountainous and dreary; the E. part is variegated with woods, lakes, and rivers. The hills feed horses, beeves, sheep, and goats, and abound with game; the rivers and lakes teem with fish and waterfowl; and the loches on the W. coast are visited regularly by a shoal of herrings. The inhabitants of the W. and S. parts speak the Erse language, which is also understood on the E. coast, where, however, English is generally spoken. The island of Lewis is attached to this county. Tain is the capital.

ROSSLYN, (Alexander Wedderburn, earl of,) an able lawyer, born in Scotland 1733. He was educated at Edinburgh university, and called to the Scotch bar 1752, and entered the next year at the Inner Temple. In parliament, as member for Richmond, he distinguished himself as a well informed orator in support of Mr. George Grenville's administration, and he espoused the cause of the mother country in the American war. He was appointed solicitor-general in 1771, attorney-general in 1778, and created 1780 baron Loughborough, and made chief justice of the common pleas. He supported the coalition ministry, and was in 1783 commissioner for keeping the great seal; but was dismissed with lord North and Mr. Fox, whose opposition to the new ministry he ably seconded in parliament. In 1793 he accepted the seals, and was in 1801 created earl Rosslyn, and soon after retired to privacy. He died suddenly 1805, at Baylis, near Salt-hill. He was author of a pamphlet, called Observations on the State of the English Prisons, and the Means of improving them; a work of merit.

ROSTEL, in botany. (*Rostellum*, from *rostrum*, a beak.) The rostel, or descending plane part of the corcle or heartlet in the first vegetation of the seed.—Pars corculi simplex descendens.

ROSTOCK, a fortified town of Lower Saxony, in the duchy of Mecklenburg, with a university, a good harbour, a strong citadel, an arsenal, and three churches. It is divided into three parts, the old, the new, and the middle town, and carries on a large trade. It was often taken in the 18th century; the last time in 1761 by the Prussians. It is seated on the river Warne, 10 miles from its entrance into the Baltic, and 32 E.N.E. of Wismar. Lon. 12. 20 E. Lat. 54. 10 N.

ROSTOF, a town of Russia, in the government of Xaroslaf, and an episcopal see. It is seated on the lake Nero, or Rostof, which communicates with the Volga by the river Kotorost, 95 miles N.E. of Moscow. Lon. 40. 25 E. Lat. 57. 5 N.

ROSTRATE FRUIT, in botany. A beaked fruit. Having a process resembling the beak of a bird: as in geranium, scandix, pecten.

RO'STRUM. *s.* (Latin.) 1. The beak of a bird. 2. The beak of a ship. 3. The scaffold whence orators harangued (*Addison*). 4. The pipe which conveys the distilling liquor into its receiver in the common alembics; also crooked scissars, which the surgeons use in some cases for the dilatation of wounds (*Quincy*).

RO'SY. *a.* (*roseus*, Latin.) Resembling a rose in bloom, beauty, colour, or fragrance (*Prior*).

To ROT. *v. n.* (ꝓotan, Saxon; *rotten*, Dutch.) To putrefy; to lose the cohesion of its parts (*Woodward*).

To ROT. *v. a.* To make putrid; to bring to corruption (*Dryden*).

ROT. A well known disease in the liver of sheep, and other domestic animals, but principally in that of the former; producing general marasmus, but not contagious; and generally evinced by the existence of large quantities of the liver-fluke, or fasciola hepatica, in this organ. It has been ascribed to a variety of causes: yet the real cause is still doubtful. The following history of the disease is fur-

lished us by Dr. Harrison, and is the best we possess.

" When in warm, sultry, and rainy weather, sheep that are grazing on low and moist lands feed rapidly, and some of them die suddenly, there is reason to fear that they have contracted the rot. This suspicion will be further increased, if a few weeks afterwards the sheep begin to shrink, and become flaccid in their loins. By pressure about the hips at this time, a crackling is sometimes perceptible. Now, or soon afterwards, the countenance looks pale, and upon parting the fleece, the skin is found to have exchanged its vermilion tint for a pale red; and the wool is easily separated from the pelt. As the disorder advances, the skin becomes dappled with yellow, or black spots. About this time, the eyes lose their lustre, and become white and pearly, from the red vessels of the tunica adnata, and eye-lids, being contracted or entirely obliterated. To this succeeds debility and emaciation, which increase continually till the sheep die; or else ascites, and perhaps general dropsy, supervene, before the fatal termination. These symptoms are rendered more severe, by an obstinate purging, which comes on at an uncertain period of the disorder. In the progress of the complaint, sheep become what the graziers call chockered, i. e. affected with a swelling under the chin, which proceeds from a fluid contained in the cellular membrane, under the throat.

" In five or six days after contracting the rot, the thin edge of the small lobe of the liver becomes of a transparent white or bluish colour, and this spreads along the upper and lower sides, according to the severity of the complaint. Sometimes it does not extend more than an inch from the margin. In severe cases, the whole peritoneum investing the liver is diseased; and then it commonly assumes an opaque colour, interspersed with dark red lines or patches. The upper part of the liver is sometimes speckled like the body of a toad, to which it is said to bear a striking resemblance: round the ductus communis choledocus, and hepatic vessels, a jelly-like matter is deposited, which varies according to the severity of the attack, from a tablespoonful, or less, to five or six times that quantity. Upon boiling, the liver loses its firmness, and separates into small pieces in the water, or remains soft and flaccid."

The doctor here observes, that graziers and butchers having remarked that sheep are much disposed to feed during the first three or four weeks after being tainted, avail themselves of this circumstance, very commonly, to increase their profits. " When the first stage is over," continues he, " flukes begin to appear in the pori biliarii, the ductus communis choledocus, and in the gall-bladder. At first, the number of these creatures is small; but as the disease advances, they increase, and before death are often very numerous. In the last part of the complaint, they are sometimes to be found in the stomach, as well as in the intestines and liver. This, like the visceral disorders of the human body, may terminate in resolution, effusion, suppuration, or schirrus.

1st, " The complaint is said to terminate in resolution, when the inflammatory action goes off, without destroying the state and texture of the parts. However, I am strongly inclined to believe, that every considerable inflammation in the human body, and in other animals, although it ends in resolution, leaves behind it some remains, which may be discovered by an experienced anatomist. When the vessels are thrown into inflammatory action for a few days only, effusion commonly takes place, and the coats become thicker, and assume a buffy colour. These changes in the sanguinary system often continue through life, and lay the foundation of many chronic and incurable disorders. Sheep that recover from the rot exhibit very different appearances after death, according to the severity of the attack; but the taint is seldom or never entirely removed." The liver of an old ewe, that lately died fat, and contained fourteen pounds of suet in her body, had the following appearances in the liver. " The back part of the small lobe was dappled with whitish spots; the coats of the ductus communis and pori biliarii were considerably thickened, and more solid than usual. In colour, they resembled the human aorta in old people, and were full of flukes: in other respects, the liver appeared to be sound and natural. The butcher asserted, that the variegated appearance and alteration in the ducts were occasioned by a slight taint of long standing, which had not been considerable enough to disorder the economy, or impair the health of the animal, sufficiently to prevent its feeding.

2dly, " When sheep die suddenly in the first stage of the disorder, an effusion of serum, or of wheyish coloured fluid, may be commonly discovered, in the cavity of the abdomen, and then the peritonæum surrounding the liver is generally covered with a membrane or coat of coagulable lymph. This form of the rot has been frequently confounded with the resp or red-water, though it differs from the latter disorder, in the colour of the effused liquid, in being much less disposed to putrefaction, and in several other particulars.

3dly, " Abscesses in the liver exhibit another termination of this malady. They are seldom considerable enough to kill immediately; but, in consequence of the absorption of purulent matter from them, the sheep frequently waste away, and die hectical or dropsical. When the collections are small, sheep will recover sufficiently to bear lambs, for three or four seasons, and afterwards become tolerable mutton.

4thly, " The most common termination is in schirri, or what the shepherds call knots in the liver. The whole substance of this important viscus has been found so full of small roundish lumps, or schirrous bodies, that it was difficult to find any sound part in it. The first attack is unfortunately so very insidious,

that the disorder is scarcely observable, before the animal begins to waste and lose flesh. In this advanced state, it is said to labour under the rot or pourriture, from overlooking the commencement of the disorder.

" Hydatids are observed to affect schirrous and purulent livers more frequently than others. When livers are much diseased, the butchers carefully conceal them from the public eye. To me, it is always matter of surprise, to find the mutton saleable in these severe cases. It shews in an extraordinary manner, the accommodating power of living matter, which is able to maintain life, and increase corpulence, under such unfavourable circumstances. Shepherds and breeders, who make it a general rule to kill every sheep that becomes indisposed, from an opinion that very few of them ever recover from any illness, would do will to examine the livers and others viscera of slaughtered sheep. By such a practice, they would soon be convinced, that sheep are able to endure a great deal." Dr. Harrison concludes his history of the rot with expressing his firm persuasion, that the uniform mortality among these animals proceeds rather from ignorance, or erroneous treatment, than from the inevitable tendency of their disorders. Reversing the order which the author observes, we shall now state his opinion of the cause of this inveterate malady.

" The disorder," says he, " has been imputed,

1st, " To a vitiated dew.

2dly, " To a grust, which adheres to the grass after wet weather, or the overflowing of running water.

3dly, " To the luxuriant and quick growth of plants, in hot, moist seasons.

4thly, " To grazing upon certain herbs.

5thly, " To fasciolæ hepaticæ, (liver-flukes) or their ova, being introduced into the stomachs of animals, by feeding on swampy and low grounds in moist weather.

6thly, " It has been called the sheep-pox, by professor Vibourg, of the veterinary college at Copenhagen; but this is not properly a cause of the rot.

7thly, " It is ascribed, by Daubenton, to poor diet, and drinking too much water."

To each of these Dr. Harrison opposes such reasoning as he thinks sufficient to demonstrate their fallacy, and concludes,

8thly, " It seems to be occasioned by poisonous effluvia, which, under certain circumstances, are emitted from marshy soils."

We must, of necessity, confine ourselves to the latter, in support of which the ingenious author offers the following strong, we had almost said decisive, facts.

" Mr. Harrison resides upon a considerable inheritance, which was formerly tenanted by his father and grandfather. It consists of high and low lands of a loamy and tenacious nature. While a brook which runs through the farm remains overflowed, and the water continues upon the adjoining flat grounds, his sheep never suffer any inconvenience, though they are frequently obliged to wade for their provisions. As soon as the flood is subsided, the sheep can at any time be tainted in a quarter of an hour, while the land retains its moisture, and the weather is hot and sultry. The butchers are so well acquainted with the importance of this fact, that when my friend has disposed of any fat sheep, they are usually turned upon his rotten ground to make them thrive faster.

" Mr. Harrison has, by judicious management, laid the greatest part of his farm completely dry, and is now little troubled with the rot, unless when he wishes to give it to some particular animals. His neighbours, who have been less provident, are still severe sufferers by it, nor are their misfortunes confined to sheep alone. Pigs, cows, asses, horses, poultry, hares, and rabbits, become rotten in this lordship, and have flukes in their livers.

" Many years since the grandfather of this gentleman removed ninety sheep, from a considerable distance, to his own residence. On coming near to a bridge, which is thrown over the Barling's river, one of the drove fell into a ditch, and fractured his fore-leg. The shepherd immediately took it in his arms to a neighbouring house, and replaced the limb. During this time, which did not occupy more than one hour, the remainder were left to graze in the ditches, and lane. The flock were then driven home, and in a month afterwards, the other sheep joined its companions. The shepherd soon discovered that all had contracted the rot, except the lame sheep; and as they were never separated upon any other occasion, it is reasonable to conclude, that the disorder was acquired by feeding in the road and ditch bottoms.

" A Lincolnshire farmer purchased some turnips in Nottinghamshire, upon which he intended to winter a flock of sheep. The first division, consisting of about forty, were detained one night at a village near to the place formerly alluded to, by the overflowing of the Barling's Eau, and were put upon a piece of flat land, which leads to the river. The water had not returned to its former channel more than a day or two. Every one of the forty sheep became rotten; whereas the other division, which stopped no where by the way, escaped the disorder, and remained well. Sheep were formerly admitted into some adjoining pastures, in travelling to and from the neighbouring fairs and markets; but so many of them contracted the rot, that, for some time past, the graziers in this country will not suffer their flocks to stop for a moment near the village. I have repeatedly examined the suspected ditches and pastures, but never observed either flukes, or any of the plants, to which the rot has been attributed; though I must candidly acknowledge, that I ought to have sought for them with more care and attention. These ditches communicate with a rivulet, which frequently overflows its banks, and the enclosures are then deluged with water. The soil consists chiefly of loam or clay, and the surface is so flat and level on

both sides of the river, that, for want of proper descent, the water is a long time detained upon the ground. I am credibly informed, that in this place the rot affects swine, hares, and rabbits, as well as sheep.

"I have likewise been informed, by Mr. David Wright, that a few years since, as a drove of sheep were passing through a long lane in the parish of Irby, one of them, being weary, fell down in the middle of the road. The others were permitted to range at large, till their companion was able to travel. They were then driven altogether into a pasture, and it was soon discovered that only the tired sheep had escaped the rot. As the flock had never been separated upon any occasion, we are entitled to conclude that the disorder was contracted while the tired animal remained upon the road."

From these and other cases the doctor thinks himself justified in attributing the rot in sheep, and other animals, to paludal effluvia; but with respect to the nature and chemical characters of such effluvia, he acknowledges it is very difficult to form any rational opinion, as they have hitherto eluded the most subtile and delicate enquiries. His suggestions on the prevention of the rot we shall notice very briefly.

"Where necessity requires the pasturage of moist grounds in summer or autumn, the shepherd ought carefully to remove his flock into a dry situation before the evening, and provide them with corn, and good hay, or green food.

"A considerable farmer of Bohemia kept his sheep sound in the wet and fatal year 1769, by feeding them every night, when turned under a shed, or into stables, with hashed straw; and by eating it greedily, they were all saved. By this judicious practice, the sheep were removed to sleep in better air, as well as preserved in a more vigorous state of body. Sir John Pringle informs us, that persons have maintained themselves in good health, during sickly seasons, by inhabiting the upper stories of their houses; and I have reason to believe, that merely by confining sheep on high grounds, through the night, they have escaped the rot.

"After the dew is exhaled by the sun's heat, sheep may be suffered to range in moist and swampy places, with less danger, because the miasmata, which are formed in the night, and remain entangled among the grass, or float in the lower part of the atmosphere, are chiefly dissipated with the dew. Therefore, unless they be very copiously produced in the day-time, or are unusually virulent, they will not be sufficiently concentrated to do much injury to healthy sheep. While at rest and asleep, the operations of the system are more feebly performed, and then sheep are peculiarly exposed to diseased actions. By conforming to these regulations, I have known one flock escape entirely, while others have suffered materially in the same open field.

"It is confidently asserted, that decoctions of bitter herbs, with salt, have frequently preserved sheep from the rot. Salt is supposed to constitute a part of Fleet's celebrated nostrum: and we know, that bitters are deservedly recommended to prevent intermittents, the dysentery, and other disorders, which originate from exhalations.

"In Oxfordshire, Dr. Lower has frequently known six or seven spoonfuls of strong brine and stale urine, with soot steeped in it, to be given with great success. This is done at spring and fall of the year, when the dew is counted most dangerous. This course of physic is continued eight or ten days, or till the sheep eat their meat heartily; and if they were taken in time, there seldom died any in a whole flock. For the same purpose, Ellis recommends the following medicine in his Practical Husbandry.

"'Take a peck or more of malt, and mash it as though you would brew it into ale or beer, and make eleven or twelve gallons of liquor; then boil in it a quantity of shepherd's purse, comfrey, sage, plantain, penny-royal, wormwood, and bloodwort: add yeast, and afterwards salt to the mixture: then turn the liquor into a vessel. After April comes in, give seven or eight spoonfuls to every sheep, once in the week, if the weather be wet, and if dry, not so often.'"

The whole of Dr. Harrison's remarks are well worth consideration. We shall conclude with the following hints.—When the shepherd determines to examine the eyes of a sheep, which ought to be done frequently, he should place it between his thighs, and hold the head with both hands. He then proceeds to raise the upper and depress the under eye-lid; by which means the blood-vessels of the tunica albuginea are brought into view. When they are red, and in great numbers, the sheep is supposed to be in good health. The caruncula lacrymalis, and inner surface of the eyelids, should be as red as the vessels on the eye-ball. If they be pale, and the veins are in small quantities, and faint-coloured, or livid, the sheep is in a debilitated state, or afflicted with the rot. In all cases where the blood-vessels have entirely disappeared, the mutton is bad. By frequently examining the eyes in dangerous seasons, shepherds might always discover the rot before their sheep begin to shrink, and, consequently, in time to prevent any material injury to their profits. Where the demand is considerable, and the market is not far distant, the grazier may always turn the rot to his advantage, by keeping the tainted sheep while they continue to feed, and taking care to kill them immediately after they cease to thrive.

Just after this article was prepared, an ingenious treatise on the Rot or Resp, by Mr. B. Holdich, reached us. We think it a valuable essay on this disease, and beg therefore to recommend it to our readers.

ROT (Dry), in timber, a decay in the wood employed in building ships, houses, or other habitations, from causes very differently assigned by different writers on the subject: and which ought perhaps to be regarded as a generic term including various species of vegetable corruption.

It occurs most frequently in what is called the sap-wood or alburnum of timber, and particularly when felled in the spring instead of in the autumn: whence Dr. Darwin conceives it to be a decay resulting from the greater quantity of sugar which the sap-wood contains in that season of the year, and the ready fermentation into which it is disposed to run; the buds and leaves exhausting it of its sugar after this period, and rendering it, in consequence, less liable to change. Whence he conceives, and with great ingenuity, that "the rot of wood might probably be entirely prevented by soaking dry timber first in lime water, till it has absorbed as much of it as may be; and then, after it is dry, by soaking it in a weak solution of vitriolic acid in water; which will unite with the lime already deposited in the pores of the timber, and convert it into gypsum;" a fact that he supposes "will not only preserve it from decay for many centuries, if it be kept dry, but also render it less inflammable, a circumstance worthy attending to in the construction of wood-built houses." He also conceives "that beams so impregnated would be less liable to swag, and boards so prepared less liable to warp."

The chief circumstances under which the rot takes place are those of moisture and want of ventilation: when these exist it will be found in the heart of timber as well as in the sap-wood; and when it once occurs, it will be often found to spread with great rapidity from one part to another, till the whole of the timber is destroyed, of whatever kind it consist, and to be communicated with great facility from one joist or plank, or one portion of a floor or wainscot to another.

It has hence been supposed by Johnson, and various others, to be the effect of a parasitic fungus, the seeds of which have by some means or other obtained an introduction into the pores of the timber, and which is denominated boletus lachrymans, a stemless plant, coriaceous, semioval, orange, with reticulate pores, and broad white border: in which case it may be regarded as a disease of a nature somewhat similar to the blight or smut of wheat; the first is perhaps the effect of the mucor erysiphe of Linnéus, and the second of a small fungus which occupies the whole ear of various gramina, and is seldom found except in this family.

The chief instrumental causes, whatever be the immediate cause, being moisture and want of ventilation, the best preventives are perfect dryness or imporosity, and a free exposure to the atmosphere. With a view of obtaining the first, which alone will succeed when pushed to a considerable extent, Mr. Batson and many other physiologists recommend charring; while another set, and with equal reason and upon the same principle, advise painting, or pitching, and taring. It is probable that the encaustic painting of the ancients, if we could revive the art, would be one of the best methods, as combining in itself both the preceding principles.

The mischief which has not unfrequently been produced from this cause to our shipping, renders it a subject of great national importance to attend to: and there is an article directed to it in this point of view in Nicholson's Journal, vol. xxx. that ought not to be overlooked, though it is published anonymously. Adopting the last of the two hypotheses to which we have above alluded, the author tells us that the dry rot proceeds from the growth of a parasitical plant named by botanists boletus lachrymans, which belongs to the class of cryptogamia. Its injurious tendency, he asserts, is mentioned as far back as history will carry us, and its appearance and ravages are particularly pointed out in the Bible, Levit. ch. xiv. "The cure there directed is, to remove the materials injured; and, if this did not stop the disease, the house was raised, and the entire articles of which it was composed taken without the city. In latter times an equally effectual but more easy remedy has been applied in buildings, where this plant has taken root—that of causing a circulation of air in the parts affected; but this cannot be introduced in the fabrics of which we are now treating.

The fatal tendency of the dry rot in ships cannot be pointed out in a more forcible way, than it is in the memoirs of Pepys, who was secretary to the Admiralty during the reigns of Charles II. and James II. At that time a commission was formed to inquire into the state of the navy, by which it appeared, that there were thirty ships called new ships, which, as he observes, "for want of proper care and attention, had toadstools growing in their holds as big as his fists, and were in so complete a state of decay, that some of the planks had dropped from their sides." From that time to the present, the evil has in some measure existed; and, although it has not since appeared in so great an extent as it then did, yet the state of some ships recently launched both justifies and demands all possible inquiry as to the causes of the growth of this fungus, and its prevention. Several means have been tried to prevent its vegetating, many of which might have answered this purpose, had they not been found to introduce evils as great as that which they pretended to cure. Among the most prominent, was the mode practised on the timbers of many ships, between the years 1768 and 1773, by saturating them with common salt; but this was found to cause a rapid corrosion in the iron fastenings, and the ships were (between decks) in a continual state of damp vapour. Mundic, found in the mines in Devonshire, has been lately employed, in fusion, to eradicate the vegetation, and prevent its future growth; but time is required to prove its efficacy.

In the common mode of constructing ships there are several causes, which promote the growth of fungi. The accumulation and consequent fermentation of materials not sufficiently seasoned, divested too of a free circulation of air, and permitting sap to remain on the edges of the frames, generate carbonic acid

gass to the prejudice of the timber, and which promotes the growth of this boletus. Mr. Humboldt has found by experiments, that eight or ten hundredths of carbonic acid gass, added to the air of the atmosphere, rendered it extremely fit for vegetation; and that the air in mines, and other subterraneous passages, was found in this state, which is very favourable to the germination of all plants of the class cryptogamia. The gass found in the openings between the timbers of ships affected with the dry rot has been proved to be precisely what Mr. Humboldt has mentioned.

The means of late proposed to prevent or cure this evil are twofold; charring the whole surfaces of the timbers, and the inner surfaces of the planks, of which the ships are composed; and causing some slight deviations to be made in the modes practised in building them. "I do not pretend, says an ingenious writer, to originality, when I recommend charring of timber, either to add to its durability, or prevent the growth of parasitical plants; for the experience of ages has proved the incorruptibility of charcoal, whether buried in the earth, or exposed to the action of air or water. The beams of the theatre of Herculaneum, which were reduced to this state by lava, were found, after a period of nearly eighteen centuries, to be perfect. The piles, supposed to have been driven into the earth by order of Julius Cæsar, when he forded the Thames at Cowey Stakes, near Shepperton, were charred, and, when recently taken up, found in a complete state, free from decay! Among many other instances, that may be adduced, the practice, almost universally adopted, of burning the ends of posts to be put into the ground, to prevent premature dissolution, may be added as an additional proof of the efficacy of this recommendation; and makes us lament, that it has not been generally introduced in fabrics, where so much timber, labour, and money, have been expended; and the hopes and expectations of government or individuals frequently disappointed, by their rapid decay.

"There are several other advantages, that will be obtained by burning the surfaces of timber. Rats, which are so destructive to ships, will not touch charcoal; nor will the white ants and cockroaches, so common in the Indies, commit their depredations on substances so prepared. If farther evidence of its utility, when employed only on a small scale, be necessary, the durability of the Royal William, the flag ship at Spithead, which was built in the year 1719, and the planks only were burned on their inner surfaces, would be sufficient to prove its efficacy when practised on ships. Of late years the ends of ships' beams have been charred, and the sound state in which they are now found has justified and established the practice. Indeed all substances, that have undergone the action of fire, have been proved to be unfavourable to the growth of the boletus lachrymans; for, while stone has been rapidly destroyed by it, well burnt bricks, in the same buildings, and in nearly the same situation, have been free from its attacks.

"The scarcity of English oak, occasioned partly by the improved state of agriculture, but more by the increased numbers of our fleet, has obliged this country to have recourse to wood grown in other states. The principal that have been introduced in aid of oak are the varieties of American pine: it becomes therefore of some importance to inquire which sort of this timber is the most durable, and which the soonest destroyed by vegetation. Pitch pine has been used by all nations in the construction of ships, and appears to be very superior to every other species for general durability; but this wood is the soonest destroyed by fungi, as these plants are nourished by the great quantity of resin contained in its numerous cells. I have lately seen some pitch pine plank of seven inches in thickness completely decomposed; and, when cut open, the boletus was found to be vegetating in every part of it, but principally in the cells which were originally filled with resin. This proves how improper it will be to employ it as treenail fastenings, on which the strength and safety of ships so much depend. Pitch pine should not be covered with paint, as the pores of the wood are thereby stopped, and the expansion of the resin prevented, by which means the ligneous cells are broken, and decomposition takes place. The Americans pay the topsides of their ships with a mixture of oil, resin, &c. which are not unlike the substances that are contained in the wood they cover, and produce a hard varnish, impervious to water. Perhaps the preparation recommended by Dr. Parry, to prevent the dry rot, given in the Transactions of the Bath and West of England Societies, might be introduced also for this purpose with success. Whitewash or lime water to be used between decks is much to be preferred to paint, both on account of its cheapness and cleansing qualities, and also as it is detrimental to vegetation.

"Instead of the frames of a ship being converted to their proper shape for some months before they are put up, and afterward standing on a slip a year to season, as is now the usual practice; I would recommend, that they should be converted, and remain, together with the planks, in that state (under cover where there shall be a free circulation of air) for two years, then charred, put up, and the planking immediately begun; commencing operations from within board, by which means chips and dirt will not accumulate between the timbers; care being taken, that the holes be not bored too near the seams in the outboard plank. Holes should be bored, but no treenails driven till within a short time of the ship's being launched; this will both convey air within board, and carry off the vegetable juices, if any remain in the interior of the timbers. The planks could be kept in their places by the usual butt bolts, and some copper nails, or small bolts ragged, being driven at intermediate spaces. This too would strengthen the ship, as metallic fastenings are always to be preferred, in the wales and bottom, to treenails.

"An objection may be made to the bringing

round thick planks in the bow of a ship by burning, rather than the usual practice of boiling them in a kiln, on account of breaking their fibres. Although I do not see that any difficulty can exist in the former method, as it is the usual practice of the French; yet, if any should occur on trial, and boiling them be considered absolutely necessary, vegetation may be prevented by dissolving some green vitriol in the water, and afterward fixing it in the wood by a weak alkali. The method approved of by many judicious shipwrights, and constantly practised by the Dutch, that of sawing the thick planks, that are to be much bent, into two parts, might also be employed for this purpose. If a doubt should exist of the efficacy of wood prepared in these several ways to prevent the dry rot, specimens might be placed in a ship almost destroyed thereby, such a one as I recollect to have seen at Woolwich about 13 years since, which was in so bad a state, that the decks sunk with a man's weight, and the orange and brown coloured fungi were hanging in the shape of inverted cones from deck to deck. A few months trial of wood put into a ship so infected would prove the efficacy of either mode of preparation."

Exsiccation of timber in an oven, as recommended by Fourcroy, is also likely to add considerably to its durability.

One farther precaution is necessary. After a ship is built, she should lie at least six months in ordinary, with her hatchways covered to prevent the admission of rain water; some planks should be removed in the ceiling, and above the waterways of the several decks; and fires constantly kept in stoves, placed in the hold, and on the decks; by which means the moisture, that the charcoal may have attracted, will be dissipated, and the durability of the fabric insured.

ROTA, in mechanics. See WHEEL.

ROTA ARISTOTELICA, or ARISTOTLE'S WHEEL, denotes a celebrated problem in mechanics, concerning the motion or rotation of a wheel about its axis; so called because first noticed by Aristotle.

The difficulty is this. While a circle makes a revolution on its centre, advancing at the same time in a right line along a plane, it describes in that plane a right line which is equal to its circumference. Now if this circle, which may be called the deferent, carry with it another smaller circle, concentric with it, like the nave of a coach wheel; then this little circle or nave will describe a line in the time of the revolution, which shall be equal to that of the large wheel or circumference itself; because its centre advances in a right line as fast as that of the wheel does, being in reality the same with it.

The solution given by Aristotle is no more than a good explication of the difficulty.

Galileo, who next attempted it, has recourse to an infinite number of infinitely little vacuities in the right line described by the two circles; and imagines that the little circle never applies its circumference to those vacuities; but in reality only applies it to a line equal to its own circumference; though it appears to have applied it to a much larger. But all this is nothing to the purpose.

Tacquet will have it, that the little circle, making its rotation more slowly than the great one, does on that account describe a line longer than its own circumference; yet without applying any point of its circumference to more than one point of its base. But this is no more satisfactory than the former.

After the futile attempts of so many great men, M. Dortous de Meyran, a French gentleman, had the good fortune to hit upon a solution, which he sent to the Academy of Sciences; where being examined by Mess. de Louville and Soulmon, appointed for that purpose, they made their report that it was satisfactory. The solution is to this effect:

The wheel of a coach is only acted on, or drawn in a right line; its rotation or circular motion arises purely from the resistance of the ground upon which it is applied. Now this resistance is equal to the force which draws the wheel in the right line, inasmuch as it defeats that direction; of consequence the causes of the two motions, the one right and the other circular, are equal. And hence the wheel describes a right line on the ground equal to its circumference.

As for the nave of the wheel, the case is otherwise. It is drawn in a right line by the same force as the wheel; but it only turns round because the wheel does so, and can only turn in the same time with it. Hence it follows, that its circular velocity is less than that of the wheel, in the ratio of the two circumferences; and therefore its circular motion is less than the rectilinear one. Since then it necessarily describes a right line equal to that of the wheel, it can only do it partly by sliding, and partly by revolving, the sliding part being more or less, as the nave itself is smaller or larger. See CYCLOID.

ROTACEÆ. (*rota*, a wheel.) The name of the fifty-second order in Linneus's Fragments; and of the twentieth in his Natural Orders.

ROTALA, in botany, a genus of the class triandria, order monogynia. Calyx three-toothed; corolless; capsule three-celled; many-seeded. One species; an annual of the East-Indies.

ROTANG. See SANGUIS DRACONIS.

RO'TARY, *a.* (*rota*, Latin.) Whirling as a wheel.

ROTAS, a town of Hindustan, in the country of Lahore, 85 miles N.W. of Lahore. Lon. 71. 52 E. Lat. 32. 4 N.

ROTAS, a town of Hindustan, in the country of Bohar, 108 miles S.W. of Patna. Lon. 84. 0 E. Lat. 24. 38 N.

RO'TATED, *a.* (*rotatus*, Latin.) Whirled round.

ROTATION, *s.* (*rotatio*, Lat.) The act of whirling round like a wheel; whirl (*Newton*).

ROTA'TION, is a term which expresses the motion of the different parts of a solid body round an axis, and distinct from the progressive motion which it may have in its revolution round a distant point. The earth has a rota-

tion round its axis, which produces the vicissitudes of day and night; while its revolution round the sun, combined with the obliquity of the equator, produces the varieties of summer and winter.

The mechanism of this kind of motion, or the relation which subsists between the intensity of the moving forces, modified as it may be by the manner of application, and the velocity of rotation, is highly interesting, both to the speculative philosopher and to the practical engineer. The precession of the equinoxes, and many other astronomical problems of great importance and difficulty, receive their solutions from this quarter: and the actual performance of our most valuable machines cannot be ascertained by the mere principles of equilibrium, but require a previous acquaintance with certain general propositions of rotatory motion.

It is chiefly with a view of assisting the engineer that we propose to deliver in this place a few fundamental propositions; and we shall do it in as familiar and popular a manner as possible, although this may cause the application of them to the abstruse problems of astronomy to be greatly deficient in the elegance of which they are susceptible.

When a solid body turns round an axis, retaining its shape and dimensions, every particle is actually describing a circle round this axis, and the axis passes through the centre of the circle, and is perpendicular to its plane. Moreover, in any instant of the motion, the particle is moving at right angles with the radius vector, or line joining it with its centre of rotation. Therefore, in order to ascertain the direction of the motion of any particle, we may draw a straight line from the particle perpendicular to the axis of rotation. This line will lie in the plane of the circle of rotation of the particle, and will be its radius vector; and a line drawn from the particle perpendicular to this radius vector will be a tangent to the circle of rotation, and will have the direction of the motion of this particle.

The whole body being supposed to turn together, it is evident that when it has made a complete rotation, each particle has described a circumference of a circle, and the whole paths of the different particles will be in the ratio of these circumferences, and therefore of their radii; and this is true of any portion of a whole turn, such as $\frac{1}{2}$, $\frac{1}{4}$, or 20 degrees, or any arch whatever; therefore the velocities of the different particles are proportional to their radii vectores, or to their distances from the axis of rotation.

And, lastly, all these motions are in parallel planes, to which the axis of rotation is perpendicular.

When we compare the rotations of different bodies in respect of velocity, it is plain that it cannot be done by directly comparing the velocity of any particle in one of the bodies with that of any particle of the other; for, as all the particles of each have different velocities, this comparison can establish no ratio. But we familiarly compare such motions by the number of complete turns which they make in equal times, and we say that the second hand of a clock turns 60 times faster than the minute hand; now this comparison is equally just in any part of a turn as in the whole. While the minute hand moves over one degree, the second-hand moves 60; therefore, as the length or number of feet in the line uniformly described by a body in its progressive motion is a proper measure of its progressive velocity, so the number of degrees described by any particle of a whirling body in the circumference of its circle of rotation, or the angle described by any radius vector of that body, is a proper measure of its velocity of rotation. And in this manner may the rotation of two bodies be compared; and the velocity is with propriety termed angular velocity.

An angle is directly as the length of the circumference on which it stands, and inversely as the radius of the circle, and may be expressed by the fraction of which the numerator is the arch, and the denominator the radius. This fraction expresses the portion of the radius which is equal to the arch which measures the angle; and it is converted into the usual denomination of degrees, by knowing that one degree, or the 360th part of the circumference, is $\frac{1}{57,296}$ of the radius, or that an arch of 57,296 degrees is equal to the radius.

When a solid body receives an impulse on any one point, or when that point is any how urged by a moving force, it cannot move without the other points also moving. And whatever is the motion of any particle, that particle must be conceived as urged by a force precisely competent to the production of that motion, by acting immediately on the particle itself. If this is not the particle immediately acted on by the external force, the force which really impels it is a force arising from the cohesion of the body. The particle immediately impelled by the external force is pressed towards its neighbouring particles, or is drawn away from them; and by this change of place, the connecting forces are brought into action, or are excited; they act on the particles adjoining, and change, or tend to change, their distances from the particles immediately beyond them; and thus the forces which connect this next series of particles are also excited, and another series of particles are made to exert their forces; and this goes on through the body till we come to the remote particle whose motion we are considering. The forces which connect it with the adjoining series of particles are excited, and the particle is moved. We frequently say that the external moving force is propagated through the body to the distant particle; but this is not accurate. The particle is really and immediately moved by the forces which connect it with those adjoining.

We have not room to enter upon the doctrine of rotatory motion in all its varieties, yet think it of far too great importance to be passed over silently: we therefore present the following propositions, in which the primary properties of compound rotatory motion are investigated from clear and unexceptionable principles.

1. Let C, (plate 149, fig. 4) be the centre of

two circular arcs AB, EF, which are the measures of the angle ACB, ECF; and let CB cut EF in D. Then, as the sectors ACB, ECD are similar, CA : CE :: AB : ED $= \frac{CE \times AB}{CA}$. But (Eu. 33. VI.) ED : EF :: the angle ACB : the angle ECF; and therefore $\frac{CE \times AB}{CA}$: EF :: ∠ACB : ∠ECF. Consequently CE × AB × ∠ECF = CA × EF × ∠ACB; and therefore AB : EF :: CA × ∠ACB : CE × ∠ECF.

2. Let ACB, GEF (fig. 5.) be two angles, of which the arcs AB, GF are the measures; and the radii CA, EG not being necessarily equal, let the lines BK, FQ be equal to one another. Let BH, FM be tangents to the curves; and let HD, MN be parallel to CA, EG respectively, and meet BK, FQ in D, N, as represented. Then as CBH, BDH are right angles, the triangles CBK, BHD are equiangular, and CB : BK :: BH : HD or its equal KL, if HL be drawn parallel to BK, and meet CA in L. Consequently BK $= \frac{CB \times KL}{BH}$. For the same reasons, if MP be parallel to FQ and meet EG in P, FQ $= \frac{EF \times QP}{FM}$; and therefore as BK, FQ are, by hypothesis, equal $\frac{CB \times KL}{BH} = \frac{EF \times QP}{FM}$. Hence CB × KL × FM = EF × QP × BH, and BH : FM :: CB × KL : EF × QP.

3. If, therefore, we suppose straight lines CH, EM to be drawn, and that the angles BCH, FEM are indefinitely small, and generated in the same time by the revolution of CB, EF respectively, then BH, FM may be considered as circular arcs, and by article 1, BH : FM :: CB × ∠BCH : EF × ∠FEM. Hence by article 2, (and 11. V.) CB × ∠BCH : EF × ∠FEM :: CB × KL : EF × QP, and therefore ∠BCH : ∠FEM :: KL : QP. Consequently, during the generation of the angles BCH, FEM, the angular velocity of CB is to the angular velocity of EF as KL to QP.

4. If ACB (fig. 6.) be any plane angle, and from any point E, EF be drawn perpendicular to AC and EH perpendicular to CB, then the angle FEH is equal to the angle ACB. For let HK be drawn perpendicular to AC, and let EH be produced to G. First let ACB be an obtuse angle, and then ∠ACB = ∠KHC + ∠HKC + ∠KHC + ∠CHG = ∠KHG = ∠FEH. Secondly, ACB being an acute angle, the right angle GHC = ∠GHK + ∠KHC = ∠KHC + ∠HCK = ∠KHC + ∠ACB. Consequently the angle ACB = ∠GHK = ∠FEH.

5. Let G (fig. 7.) be the centre of gravity of a body, and AB, DC two axes passing through G; and, while the body revolves round AB, let AB and consequently the whole body revolve round DC, the periodical times of these revolutions not being necessarily equal; it is required to determine the direction and angular velocity with which any particle of the body revolves in consequence of this compound motion.

Suppose the simple motion of the body about AB to be such, that during the revolution the parts towards D from AB would rise above the plane, on which the figure is drawn, and the parts towards C sink below it. And suppose the simple motion about DC to be such, that during the revolution the parts towards A from DC would rise above the plane of the figure, and those towards B sink below it. Let P (fig. 8.) be a particle of the body, above the plane, and let PR be a perpendicular to the said plane. With the centre G suppose a spherical superficies to be described, passing through P and let ADBC be the great circle of this sphere in the plane on which the whole is represented. Let the straight lines EF, HK pass through R, and be perpendicular to AB, DC respectively; and let EPF, HPK be lesser circles of the sphere, EF being a diameter of the one, and HK a diameter of the other. Then it is evident, that by the simple motion of the body about AB only the particle P would move in the circumference FPE; and by the simple motion of the body about DC only, P would move in the circumference HPK. Let the indefinitely small arcs Ps, Pq be those which P would describe in equal times with the revolutions about AB, DC separately, and let the parallelogram $Pqps$ be completed on the spherical superficies. Then it is evident, from the composition of motion, that the direction and velocity of P, in consequence of the compound motion, is as the diagonal Pp of the parallelogram $Pqps$.

Let $RrMN$ be the orthographical projection of $Pqps$ on the plane ADBC, and then as PR is perpendicular to this plane, it is evident that $RrMN$ is a parallelogram, and that its diagonal RM is the direction and velocity of P in the projection, in consequence of the compound motion. It therefore follows, from article 3, as RN is the angular velocity about the axis AB, and Rr that about the axis DC, that RM is the angular velocity about the axis, round which the body is caused to revolve by the compound motion.

6. The same things being supposed, and the parallelogram $RrMN$ being the same in fig. 7 as in fig. 8, let RM produced meet the circumference in L and Q, and the diameter TGS, at right angles to LQ, is the axis sought.

The same axis may be obtained in the following manner. In GB take GV equal to RN; and in GC take GW equal to Rr, and VW being drawn it will be parallel to the axis TS. For as NR is perpendicular to AB, and Rr or NM to DC, by article 4, the angle RNM, or its equal RrM, is equal to the angle VGW. Also, on account of the equals, VG : GW :: Mr : rR, and therefore the angles rRM, GWV are equal. Let TS meet HK in O, and LQ in I; and let DC meet HK in X. Then as the angle OIR is equal to the angle OXG, each being a right one, and as the angles IOR, XOG are equal, the angle IRO, or MRr is equal to the angle OGX. Consequently the alternate angles XGO, GWV are equal, and therefore TS, VW are parallel. Hence it is evident that if the axes AB, DC, and also GV, GW the angular velocities round

Fig. 1.

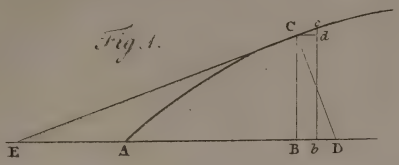


Fig. 3.

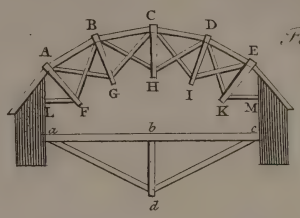
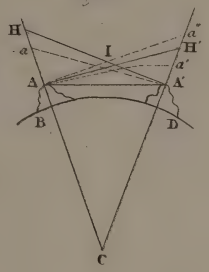


Fig. 2.



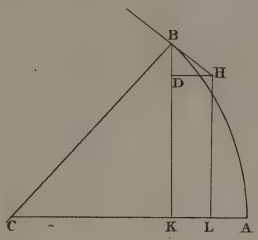


Fig. 5.

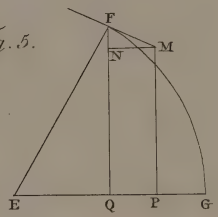


Fig. 4.

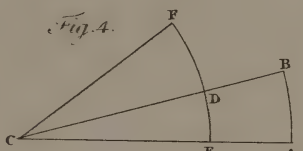
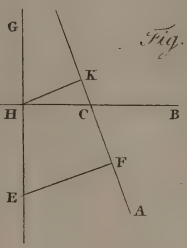


Fig. 6.



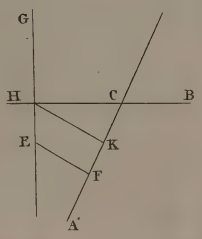


Fig. 7.

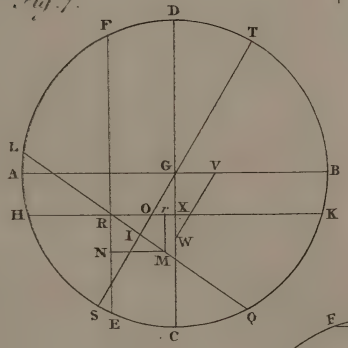


Fig. 8.

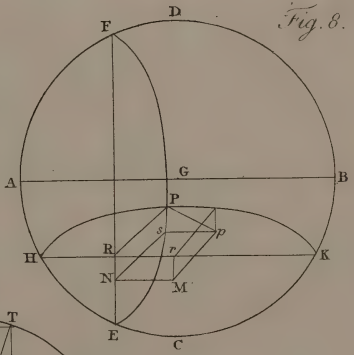
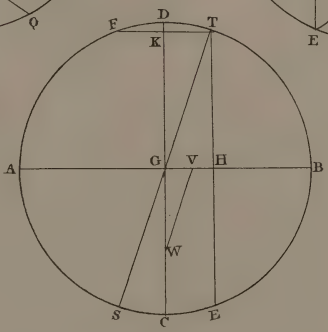


Fig. 9.



Mutlow sc Russell Co.

London, Published by Sherwood & Co. Paternoster Row, Aug. 1. 1812.

them be given, the axis TS is easily found, being parallel to VW. It is proper to observe that GV, GW are to be set off on that side of TS towards which the body is moving, in consequence of the revolutions round DC, AB.

7. From the last article it is evident that VW is equal to RM, and consequently equal to the angular velocity, with which the body revolves about the axis TS. If therefore CGB be a right angle, then the angular velocity $VW = \sqrt{VG^2 + GW^2}$. In other cases the value of VW may be easily calculated by plane trigonometry.

8. It is to be remarked, for the sake of precision, that the linear velocity of any point is as the angular velocity multiplied into the radius of the circle in whose circumference it revolves. Thus the linear velocity Ps (fig. 8.) of the point P in the circumference FPE, is as its angular velocity in the same, multiplied into the radius of the circle FPE, as is evident from article 3. In the following articles, linear velocity is meant when no adjective is annexed to the word velocity.

9. Let AB, DC (fig. 9.) be the two axes about which separately the body would revolve, as stated in article 5, and let TS be the axis about which it revolves, in consequence of a combination of these two revolutions. Let TE be at right angles to AB, and meet it in H, and let TF be at right angles to DC, and meet it in K; and let GV, GW be the angular velocities about AB, DC, as in the preceding articles. Then it follows, from the last article, that the velocity of the point T, by the revolution about the axis AB only, is equal to GV × HT. And as this velocity is in the direction of a tangent at T to the circle of which TE is a diameter, and as this circle is perpendicular to the plane ADBC, the direction of this velocity is evidently perpendicular to the plane ADBC. The direction of this velocity of the point T is also upwards from the plane of the figure, agreeable to the statement in article 5. Again, by the revolution about the axis DC only, the velocity of T is equal to GW × KT, and, for the foregoing reasons, the direction of this velocity of the point T is perpendicularly downwards below the plane, according to article 5. Now as TS is the axis about which the body revolves, in consequence of the combined revolutions about AB, DC, every point in TS is rendered quiescent by the compound motions. It is therefore evident that GV × HT = GW × KT.

10. The revolutions about DC, AB may be supposed to be caused by instantaneous impulses at A and D, made at the same time, or at different times; or they may be supposed to be occasioned by the agency of constant forces, like that of gravity. For if the causes be adequate to the production of the same velocities, taken separately, and in the same directions, the velocity and direction of a particle will be the same from their combined influence upon it, whether these causes be impulses or constant forces.

As the body is understood to be in free space, if the causes of the revolutions, taken separately, be instantaneous impulses, and made at the same time, immediately after their agency the body will revolve about the axis TS, and it will continue so to revolve with an uniform velocity. If whilst the body is revolving with an uniform velocity about the axis DC, a constant force begin to act at D, so as to cause a tendency to revolution about AB, as stated in article 5, and continue afterwards to act at T, the pole of the new axis, from a combination of the constant agency at the new pole and the uniform velocity about DC, the axis TS will incessantly shift its position.

Such exactly are the circumstances to which the earth is subject as to the production of the precession of the equinoxes. See PRECESSION. The preceding are the leading propositions. The following two are added, by reason of their usefulness, but without demonstration.

11. A body may begin to revolve on any line as an axis, that passes through its centre of gravity, but it will not continue to revolve permanently about that axis, unless the opposite centrifugal forces exactly balance one another.

Thus, a homogeneous sphere may revolve permanently on any diameter, because the opposite parts of the solid, being in every direction equal and similar, the opposite centrifugal forces must be equal; so that no force tends to change the position of the axes.

Also, a homogeneous cylinder may revolve permanently about the line which is its geometric axis. It may also revolve permanently about any line that bisects that axis at right angles; but it can revolve permanently about no other line, since the centrifugal forces cannot be equal. The same is true with respect to all solids of revolution.

12. In every body, however irregular, there are three permanent axes of rotation, at right angles to one another, on any one of which when the body revolves the opposite centrifugal forces exactly balance one another. These are called the principal axes of rotation

This singular theorem was first proposed by Segner in 1755, and first demonstrated by Albert Euler, in a memoir crowned at Paris, in 1760. Leonard Euler has also given a demonstration of it in his treatise de Motu Corporum rigidorum, prop. 27. See also Frisius, de Rotatione Corporum quorum cunque, theorema vii.; and Gregory's Mechanics, vol. i. book 2. chap. 4.

These three axes have also this remarkable property, that the momentum of inertia with respect to any of them, is either a max. or a min., that is, is either greater or less than if the body revolved about any other axis.

ROTA'TOR. *s.* (Lat.) That which gives a circular motion (*Wiseman*).

ROTE. *s.* (*rote*, old Fr.) 1. A harp; a lyre: obsolete (*Spenser*). 2. (*routine*, French.) Words uttered by mere memory without meaning; memory of words without comprehension of the sense (*Swift*).

To ROTE. *v. a.* To fix in the memory, without informing the understanding (*Shaksp.*).

ROTENBERG, a town and fortress of Franconia, capital of a lordship of the same name; situate on a mountain, 18 miles N.E. of Nurenburg, and 27 S.S.W. of Bayreuth.

ROTENBURG, a town of Swisserland, in the canton of Lucern, four miles N. of Lucern.

ROTENBURG, a town of Westphalia, in the duchy of Verden, on the river Wumme, 15 miles N. by E. of Verden.

ROTENBURG, a town of Germany, in the late bishopric of Spire, 12 miles E. of Philipsburg.

ROTENBURG, a town of Germany, in Lower Hesse, with a palace, belonging to the prince of Hesse-Rheinfes; seated on the Fulda, 24 miles S.S.E. of Cassel.

ROTGUT. *s.* Bad beer (*Harvey*).

ROTH, a town and castle of Franconia, in the principality of Anspach. It is the birthplace of the celebrated Gessner, and stands at the conflux of the Roth with the Rednitz, 18 miles S. of Nuremberg.

ROTHBURY, a town in Northumberland, with a market on Friday; seated on the Coquet, nine miles S.W. of Alnwick, and 302 N. by W. of London.

ROTHENBERG, a town of Upper Lusatia, on the river Neissa, 17 miles N. of Gorlitz.

ROTHENBURG, a town of Franconia, capital of a territory of the same name. It is surrounded by moats and ramparts, and stands on a mountain by the river Tauber, from which it is supplied with water by means of a machine. It has five churches, and was lately an imperial town. It is 15 miles W.N.W. of Anspach. Lon. 10. 18 E. Lat. 49. 22 N.

ROTHER, a river which rises in Sussex, forms the boundary between that county and Kent for a short space, and enters the English channel at Rye.

RO'THER-NAILS. *s.* Among shipwrights, nails with very full heads, used for fastening the rudder irons of ships (*Bailey*).

ROTHERHAM, a town in W. Yorkshire, with a market on Monday. It has a large church, and is famous for considerable ironworks in its vicinity at Masbrough. It is seat at the conflux of the Rother with the Don, 32 miles S. of Leeds, and 159 N. by W. of London.

ROTHIA, in botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle villous, with the margin chaffy; calyx of many equal leaves; down of the centre, simple and sessile; of the ray none. Three species; natives of the south of Europe.

ROTHSAY, a borough of Scotland, the capital of the isle of Bute. Here is an ancient castle, once a royal palace, which gives the title of duke to the heir apparent of the crown. It has a considerable trade in the herring fishery, and several cotton works. In 1801, the number of inhabitants was 5231. It is situate on the E. side of the island, and has an excellent harbour and pier, 80 miles W. by S. of Edinburg. Lon. 4. 53 W. Lat. 55. 48 N.

ROTHWEIL, a town in Suabia, lately imperial, but given in 1802 to the duke of Wirtemberg. Two miles to the S. is Rothmunster abbey, where they receive none but noble women. Rothweil is seated on the Neckar, near its source, 27 miles S.S.W. of Tubingen. Lon. 8. 37 E. Lat. 48. 8 N.

ROTIFER, in zoology, a microscopic animalcule of a very singular character, inhabiting the sand of tiles and sewers, and called by Spalanzani and various other naturalists the wheel-animal, from its peculiar formation. The abdomen is comparatively large, and situated towards the middle of the body, in the central regions of which some microscopists have conceived that they have discerned traces of a heart. The posterior part of the animal is provided with a minute trident, and the anterior divides into two trunks, bearing two most singular wheels at the summits, whence its ordinary name.

If the sand in which it exists be put in water and remain infused for some time, it will exhibit all its organs. If the water fail, the action of the wheels and supposed heart ceases; the animalcule gradually loses motion, and becomes apparently lifeless; it contracts, grows very minute, and assumes the resemblance of a piece of dry emaciated skin. If the sand be moistened, it revives; the body soon extends, the wheels and trident re-appear, and general motion is regenerated. That it has remained long dry in the sand is of no importance. Leeuwenhoek, who first discovered it, asserts that he has seen it re-animated after having been kept in dry sand for nearly two years: and Spalanzani has recovered it after nearly double this period. "Some sand," says he, "is in my possession on which I made experiments near four years ago, and it has been kept dry in a small glass bottle. When moistened, the wheel-animals in it instantly revive. However," he continues, "these facts must be understood with some limitation. Though the animals do revive repeatedly, and even after remaining long dry, it is certain that the number revived always decreases in proportion to the length of time the sand has continued in an arid state, and the number of times it has been wetted for their resurrection. The first time I recovered them, they were very numerous, but the numbers continually decreased, and at last became very small; none revived the sixteenth time. I have preserved the sand dry in a box for three years, only moistening once in every fifth or sixth month, but the resurrections are always fewer, and now, at the end of the third year, it is no exaggeration to say that one third do not revive." See TILEEELS.

ROTTBÆLIA, in botany, a genus of the class triandria, order digynia. Calyx fixed, mostly one-flowered, simple or two-parted; flowers ranged alternately on a jointed common receptacle. Sixteen species, indigenous to the south of Europe and both the Indies; one, rottbælia incurvata, common to the salt-marshes of our own country, denominated hard-grass.

ROTONDO, (*rotunda*) in architecture, a popular term for any building that is round both within and withoutside, whether it be a church, hall, a saloon, a vestible, or the like.

The most celebrated rotondo of antiquity is the Pantheon at Rome, dedicated to Cybele, and all the gods, by Agrippa, son-in-law of Augustus; but since consecrated by pope Boniface

IV. to the Virgin, and all the saints, under the title of Sta. Maria della Rotondo.

The chapel of the Escurial, which s the burying-place of the kings of Spain, is also a rotondo; and in imitation of that of Rome, is also called Pantheon.

RO'TTEN. *a.* (from *rot.*) 1. Putrid; carious; putrescent (*Sandys*). 2. Not firm; not trusty (*Shakspeare*). 3. Not sound; not hard (*Knolles*) 4. Fetid; stinking (*Shakspeare*).

RO'TTENNESS. *s.* (from *rotten.*) State of being rotten; cariousness; putrefaction (*Shakspeare*).

ROTTEN-STONE, in mineralogy, a species of argillaceous earth. See CARIOSUS.

ROTTERDAM, a city of S. Holland, with one of the finest harbours in the Netherlands. It is the most considerable place in Holland, for the beauty of its buildings, and trade, next to Amsterdam; and the inhabitants are computed at 48,000. There are so many deep canals, that ships may unload at the very doors of the warehouses. On the E. side of the city is a large basin and dock, for the purpose of building and launching vessels employed in the service of the admiralty and the East-India Company. This port is more frequented than Amsterdam, because the ice breaks up sooner, and the tide, in two or three hours, will carry a ship into the open sea. The townhouse, the bank, and the arsenal are magnificent. Some of the houses are built in the old Spanish style, with the gable ends embattled in front; but there is a great number of modern brick houses, which are lofty and spacious, particularly on that magnificent quay called the Bomb Tees. On this quay is a handsome Jewish synagogue. Erasmus was born in this city, whose statue in bronze stands in an open place, at the head of one of the canals; and the house in which he was born has an inscription, in front, to his honour. Rotterdam received the French troops, Jan. 23, 1795. It is seated at the influx of the Rotte with the Merwe (the most northern branch of the Meuse) 30 miles S.S.W. of Amsterdam. Lon. 4. 29 E. Lat. 51. 56 N.

ROTTERDAM, one of the Friendly islands, in the Pacific ocean, discovered by Tasman in 1643. Lon. 174. 30 W. Lat. 20. 16 S.

RO'TULA, in anatomy. (*Rotula*, of *rota*, a wheel; so called from its shape.) See PATELLA.

ROTU'ND. *a.* (*rotundus*, Latin.) Round; circular; spherical (*Addison*).

ROTU'NDIFOLIUS. *a.* (*rotundus* and *folium*, Latin.) Having round leaves.

ROTU'NDITY. *s.* (*rotunditas*, Latin.) Roundness; sphericity; circularity (*Bentley*).

ROTUNDO. See ROTONDO.

To ROVE. *v. n.* (*roffver*, Danish.) To ramble; to range; to wander (*Watts*).

To ROVE. *v. a.* To wander over (*Gay*).

ROUEN, a city of France, capital of the department of Lower Seine, with an archbishop's see. It is seated on the N. side of the Seine. The streets are narrow, crooked, dirty, and consist of wooden houses; notwithstanding which, it is one of the most opulent and important places in France. It is two leagues and a half in circuit, and (its six suburbs included) is computed to contain 73,000 inhabitants. Among the public buildings, the most distinguished are, the Great Hall of the Palace, in which the late parliament of Rouen met; the old castle; and the principal church, ornamented with three towers, in one of which is the great bell, which bears the name of cardinal George d'Amboise, a minister, whose memory is much respected in France. Near this church, which is not the only remarkable one, is the public library. The steeple of the late Benedictines of St. Owen is an elegant Gothic structure. The linens of Rouen, particularly what are called the Siamoise, are much esteemed. There are also manufactures of cloth, and one of oil of vitriol. The suburb of St. Sever, situate on the other side of the Seine, communicates with the city by a bridge of boats, which rises and falls with the tide, and is made to open so as to admit the passage of the ships. Rouen is the birth-place of the two Corneilles, and of Fontenelle. It is 50 miles S.W of Amiens, and 70 N.W. of Paris. Lon. 1. 10 E. Lat. 49. 27 N.

RO'VER. *s.* (from *rove.*) 1. A wanderer; a ranger. 2. A fickle inconstant man. 3. A robber; a pirate (*Bacon*). 4. *At* ROVERS. Without any particular aim (*South*).

ROVEREDO, or ROVERE, a town of Austria, in the Tyrol, seated on the Adige, at the foot of a mountain, and on the side of a stream, over which is a bridge, defended by two large towers and a strong castle. The Austrians were defeated near this place, in 1796, by the French, who took possession of the town; but they were obliged to abandon it soon afterward. It is eight miles S. of Trent. Lon. 11. 27 E. Lat. 46. 0 N.

ROVERBELLA, a town of Italy, in the duchy of Mantua, 12 miles N.N.W. of Mantua. Lon. 10. 42 E. Lat. 45. 18 N.

ROUERGUE, a late province of France, in the government of Guienne, 75 miles long and 50 broad; bounded on the E. by the Cevennes and Gevaudan, on the W. by Querci, on the N. by the same and Auvergne, and on the S. by Languedoc. It is not very fertile, but feeds a number of cattle, and has mines of copper, iron, alum, vitriol, and sulphur. It now forms the department of Aveiron.

ROUGE. *s.* (*rouge*, French.) Red paint.

ROUGE, a celebrated cosmetic prepared chiefly from the red dye of the safflower, or carthamus lanatus or tinctorius of Linnéus. See SAFFLOWER.

ROUGE ET NOIR, or RED AND BLACK, in card-playing, a modern game, so styled, not from the cards, but from the colours marked on the tapis or green cloth with which the table is covered.

The first parcel of cards played is usually for noir, the second for rouge, though sometimes the cards are cut to determine which shall begin. All the terms of this game are French, and that language is used in playing. Any number of persons may play, and the punters may risk their money on which colour they please, placing the stakes on the outer semicir-

cle; but after the first card is turned up, no stakes can be laid for that coup.

The tailleur and croupier are seated opposite each other, with a basket for receiving the cards of every coup after dealing, placed on the middle of the table. The tailleur then passing round six packs of cards to be shuffled and mixed confusedly all together by the company, afterwards finally shuffles them, and inserts all the end cards into various parts of the 312, till he meets with an honour, which, being placed upright at the end, is offered to a punter, who putting the same into any part of the pack, the tailleur there separates it, and lays that part which was below the said honour uppermost, and taking therefrom a handful of cards, and placing a weight upon the remainder, proceeds to deal, taking afterwards other parcels from the heap as they may be wanted, till all are dealt out. He looks at the first card, and puts its face downwards; two others, one red, and the other black, are then laid back to back, and that placed conspicuously uppermost which is of a similar colour with the first card; these two cards are turned according to the colour of that card which afterwards may be dealt in each succeeding coup. When the stakes are deposited, the tailleur cries noir, turns the top card, and places each succeeding one in a row, till the points of those so turned shall exceed 30; he then declares the numbers, at trente et une, one-and-thirty; or, if above that, up to 40, he only says, deux, trois, quatre, cinque, six, sept, huit, neuf, two, three, four, five, six, seven, eight, nine, and when forty, quarante.

Another parcel is then dealt in a similar mode for rouge, and the punters win who had staked on that colour, the points for which were 31 or nearest to it, which the tailleur declares, by saying rouge gagne, red wins; or rouge perd, red loses. These two parcels, one for each colour make a coup. When the same number is dealt for each, the tailleur says apres, after, which forms un refait, or doublet, by which neither party loses, except it be un refait trente et un, one-and-thirty, when the tailleur wins half the stakes punted on each colour, which half the punters may either pay, or have their stake moved into the middle semicircles of the colour they then choose, called la premiere prison, the first prison, to be determined by the next event, whether they lose all, or are set at liberty; but if un refait second trente et un, a second doublet of one-and-thirty, should occur in the next succeeding deal, the punters lose only one half of their remaining moiety, making three-fourths of their original stakes, and are removed into the smallest semicircle, stiled la seconde prison, the second prison, and the next coup determines whether the punter loses all, or is to be removed again into la premiere prison.

Punters after winning may paroli, &c. and pursue their luck up to a soixante, as at faro; but as no livrets are used at rouge et noir, they cannot make either paix or pont.

At this game, a banker cannot refuse any stake not exceeding his fund; which the punter declares, by saying Je va la banque, Va la banque, or Va banque, I aim at the bank. Bankers generally furnish punters with slips of card paper, ruled in columns, each marked N or R at the top, on which accounts are kept by pricking with a pin, and when un refait happens, the same is denoted by running the pin through the middle line. Some bankers give up the profit of the refait during the first deal.

The odds against le refait being dealt are reckoned 63 to 1, but bankers expect it twice in three deals, and there are generally from twenty-nine to thirty-two coups in each deal.

ROUGH. *a.* (hnuh, Sax. *rouw*, Dutch.) 1. Not smooth; rugged; having inequalities on the surface (*Burnet*). 2. Austere to the taste: as, rough *wine*. 3. Harsh to the ear (*Pope*). 4. Rugged of temper; inelegant of manners; not soft; coarse; not mild; rude (*Cowley*). 5. Not gentle; not proceeding by easy operation (*Clarendon*). 6. Harsh to the mind; severe (*Locke*). 7. Hard featured; not delicate (*Dryden*). 8. Not polished; not finished by art. 9. Terrible; dreadful (*Milton*). 10. Rugged; disordered in appearance; coarse (*Pope*). 11. Tempestuous; stormy; boisterous (*Shakspeare*).

To ROU'GHCAST. *v. a.* (*rough* and *cast.*) 1. To mould without nicety or elegance; to form with asperities and inequalities (*Cleav.*). 2. To form any thing in its first rudiments.

ROU'GHCAST. *s.* (*rough* and *cast.*) 1. A rude model; a form in its rudiments (*Digby*). 2. A kind of plaster mixed with pebbles, or by some other cause very uneven on the surface.

ROU'GHDRAUGHT. *s.* (*rough* and *draught.*) A draught in its rudiments; a sketch (*Dryden*).

To ROU'GHDRAW. *v. a.* (*rough* and *draw.*) To trace coarsely (*Dryden*).

To ROU'GHEN. *v. a.* (from *rough.*) To make rough (*Swift*).

To ROU'GHEN. *v. n.* To grow rough (*Thomson*).

To ROUGHHE'W. *v. a.* (*rough* and *hew.*) To give to any thing the first appearance of form (*Hudibras*).

ROUGHHE'WN. *particip. a.* 1. Rugged; unpolished; uncivil; unrefined (*Bacon*). 2. Not yet nicely finished (*Howel*).

ROU'GHLY. *ad.* (from *rough.*) 1. With uneven surface; with asperities on the surface. 2. Harshly; uncivilly; rudely (*Spenser*). 3. Severely; without tenderness (*Dryden*). 4. Austerely to the taste. 5. Boisterously; tempestuously. 6. Harshly to the ear.

ROU'GHNESS. *s.* (from *rough*). 1. Superficial asperity; unevenness of surface (*Boyle*). 2. Austereness to the taste (*Brown*). 3. Taste of astringency (*Spectator*). 4. Harshness to the ear (*Dryden*). 5. Ruggedness of temper; coarseness of manners; tendency to rudeness (*Denham*). 6. Absence of delicacy (*Addison*). 7. Severity; violence of discipline. 8. Violence of operation in medicines. 9. Unpolished or unfinished state. 10. Inelegance of dress or appearance. 11. Tempestuousness; storminess. 12. Coarseness of features.

ROUGHT. old pret. of *reach*. Reached.

To ROU'GHWORK. *v. a.* (*rough* and

work). To work coarsely over without the least nicety (*Moxon*).

ROVIGNO, a populous town of Venetian Istria, with two good harbours, and quarries of fine stone. It is seated in a territory which produces excellent wine, on a peninsula, on the western coast, eight miles S. of Parenzo, and 32 of Capo d'Istria. Lon. 14. 2 E. Lat. 45. 16 N.

ROVIGO, a town of Italy, capital of Polesino di Rovigo, seated on the Adige, 21 miles S. of Padua, and 37 S.W. of Venice. Lon. 12. 14 E. Lat. 45. 38 N. See POLESINO DI ROVIGO.

ROULADE, in music, a trill or shake.

ROU'NCEVAL. *s.* A species of pea (*Tusser*).

ROUND. *a.* (*rond*, French; *rondo*, Italian.) 1. Cylindrical (*Milton*). 2. Circular (*Brown*). 3. Spherical; orbicular (*Milton*). 4. Smooth; without defect in sound (*Peach.*). 5. Whole; not broken (*Arbuthnot*). 6. Large; not inconsiderable (*Addison*). 7. Plain; clear; fair; candid; open (*Bacon*). 8. Quick; brisk (*Addison*). 9. Plain; free without delicacy or reserve; almost rough (*Bacon*).

ROUND. *s.* 1. A circle; a sphere; an orb (*Shakspeare*). 2. Rundle; step of a ladder (*Norris*). 3. The time in which any thing has passed through all hands, and comes back to the first: hence applied to a carousal (*Prior*). 4. A revolution; a course ending at the point where it began (*Smith*). 5. Rotation; succession in vicissitude (*Holyday*). 6. (*ronde*, Fr.) A walk performed by a guard or officer, to survey a certain district.

ROUND. *ad.* 1. Every way; on all sides (*Genesis*). 2. In a revolution (*Gov. of the Tongue*). 3. Circularly (*Milton*). 4. Not in a direct line (*Pope*).

ROUND. *prep.* 1. On every side of (*Milton*). 2. About; circularly about (*Dryden*). 3. All over; here and there in (*Dryden*).

To ROUND. *v. a.* (from the noun.) 1. To surround; to encircle (*Prior*). 2. To make spherical; cylindrical, or circular (*Cheyne*). 3. To raise to a relief (*Addison*). 4. To move about any thing (*Milton*). 5. To mould into smoothness (*Swift*).

To ROUND. *v. n.* 1. To grow round in form (*Shakspeare*). 2. (*runen*, Ger.) To whisper (*Bacon*). 3. To go round, as a guard (*Milton*).

ROUND. A species of fugue in the unison, composed in imitation of a catch, and so called because the performers follow each other through the several parts in a circulatory motion.

ROUND LIGAMENTS. (*ligamenta rotunda.*) A bundle of vessels and fibres contained in a duplicature of the peritonæum, that proceed from the sides of the uterus, through the abdominal ring, and disappear in the pudenda.

ROUND, or VOLTE, in the manage. A circular head. See VOLTE. *To round a horse*, or make him round, a general expression of all kinds of manage upon rounds. To round a horse upon a trot or gallop, is to make him carry his shoulders and haunches compactly, or roundly, upon a greater or smaller circle, without traversing, or bearing to one side.

ROUND, in a military sense, signifies a walk which some officer, attended with a party of soldiers, takes in a fortified place around the ramparts, in the night-time, in order to see that the centries are watchful, and every thing in good order.

The centries are to challenge the rounds at a distance, and rest their arms as they pass, to let none come near them; and when the round comes near the guard, the centry calls aloud, "who comes there?" and being answered, "the rounds;" he says, "stand;" and then calls the corporal of the guard, who draws his sword, and calls also, "who comes there?" and when he is answered, "the rounds," he who has the word advances, and the corporal receives it with his sword pointed to the giver's breast. In strict garrison, the rounds go every quarter of an hour.

ROU'NDABOUT. *a.* 1. Ample; extensive (*Locke*). 2. Indirect; loose (*Felton*).

ROUNDELAY, or RONDEL. (from the French word *rondelet*.) A kind of ancient poem, so called, according to Menage, from its form, by which it constantly returned to the first verse, and thus went round. The common roundelay consisted of thirteen verses, eight in one rhyme, and five in another. One of its rules was, that the first verse should have a complete sense, and yet join agreeably with the closing verse, though in itself independent. Some writers speak of the roundelay, or rondel, as a kind of air appropriated to dancing; and in this sense, the word seems to imply little more than dancing in a circle. Our old English poets use this word as signifying a simple, rural strain, both short and lively.

ROU'NDER. *s.* (from *round.*) Circumference; enclosure (*Shakspeare*).

ROU'NDHEAD. *s.* (*round* and *head.*) A puritan, so named from the practice once prevalent among them, of cropping their hair round (*Spectator*).

ROUN'DHOUSE. *s.* (*round* and *house.*) The constable's prison, in which disorderly persons, found in the street, are confined (*Pope*).

ROU'NDISH. *a.* (from *round.*) Somewhat round; approaching to roundness (*Boyle*).

ROU'NDLY. *ad.* (from *round.*) 1. In a round form; in a round manner. 2. Openly; plainly; without reserve (*Addison*). 3. Briskly; with speed (*Locke*). 4. Completely; to the purpose; vigorously; in earnest (*Davies*).

ROU'NDNESS. *s.* (from *round.*) 1. Circularity; sphericity; cylindrical form (*Watts*). 2. Smoothness (*Spenser*). 3. Honesty; openness; vigorous measures.

To ROUSE. *v. a.* (of the same class of words with *raise* and *rise.*) 1. To wake from rest (*Pope*). 2. To excite to thought or action (*Atterbury*). 3. To put into action (*Spenser*). 4. To drive a beast from his laire (*Shakspeare*).

To ROUSE. *v. n.* 1. To awake from slumber (*Pope*). 2. To be excited to thought or action (*Shakspeare*).

ROUSE. *s.* (*rusch*, German, half drunk.) A dose of liquor rather too large: not in use (*Shakspeare*).

ROU'SER. *s.* (from *rouse*.) One that rouses.

ROUSSEAU (James), a painter of great merit, born at Paris, in 1630. He excelled in representations of architecture by his skill in perspective. Louis XIV. employed him to decorate the room at St. Germain's, in which Lully's operas were performed. Lord Montagu also engaged him, along with La Fosse and Monnoyer, to embellish his mansion house. He died at London, in 1693.

ROUSSEAU (John Baptist), a French poet, was the son of a shoemaker at Paris, and born in 1669. However, he received a good education, and distinguished himself, when young, by some little ingenious pieces of poetry, which recommended him to marshal Tallard, who took him to England as his secretary. He was greatly favoured by the great, but he is reported to have cultivated the muses at court, and neglected fortune in the midst of riches. His interest could not secure him from a sentence of banishment, for suborning a witness in order to throw the imputation of a libel upon an innocent person, against whom he had a violent animosity. The count de Luc, nevertheless, patronized him, and prince Eugene took him to Vienna. From thence he went to Brussels, where a misunderstanding commenced between him and Voltaire. He was in London in 1721, and printed there a collection of his works in 2 vols. 4to. He died at Brussels in 1741. He wrote odes, epistles, epigrams, and comedies in verse, also a collection of letters in prose.

ROUSSEAU (John James), an eccentric genius, was the son of a watchmaker at Geneva, where he was born in 1712. His birth cost his mother her life, and, as he says, was the first of his misfortunes. His earliest reading was romances, to which succeeded better books, as Bossuet's Discourses on Universal History, Plutarch's Lives, &c. His education was but scanty, but he made up for this by self-application. His friends put him apprentice to an engraver, from whom he says he learnt to be idle, and even to steal: at length the brutal behaviour of his master forced him to elope from him; and, by the kindness of M. de Pontverre, the rector of Consignon, in Savoy, he was recommended to madam de Warens, a charitable lady at Annecy. By her assistance he went to Turin with letters of recommendation, and was admitted into a seminary there, having been first made a proselyte to the Roman catholic religion by his benefactress. He was soon disgusted with his new life, which he quitted almost pennyless, and was obliged to engage himself as a footman to a lady of quality. She dying in three months, her nephew procured him another place out of livery. He was reduced to great distress, when he was employed to copy music for a small allowance. He afterwards became a composer and teacher of music; and about the year 1743 began to launch out of the obscurity in which he had been buried. It was not, however, till the year 1750 that he appeared in the field of literature, when the academy of Dijon proposed the question, "Whether the re-establishment of the arts and sciences had contributed to purify morals," in answering which he supported the negative, and the academy crowned his work. His next work was A discourse upon the causes of the inequality among men; and upon the origin of societies. In 1752 he composed a dramatic pastoral, called The Devin-de Village: he published also, in 1757, A letter to M. d'Alembert upon the project of establishing a theatre at Geneva, which occasioned the quarrel between him and Voltaire. He composed a dictionary of music, which contains some very excellent articles, though it is a work of great inequality.

That interesting and tender style, which is so conspicuous throughout the Village Conjuror, animates several letters in the New Heloisa, in six parts, published in 1761, in 12mo. This epistolary romance, of which the plot is ill-managed, and the arrangement bad, like all other works of genius, has its beauties as well as its faults, though the latter sadly preponderate. The characters, as well as their style, have too much sameness, and their language is too affected and exaggerated. Some of the letters are indeed admirable, from the force and warmth of expression, from an effervescence of sentiments, from the irregularity of ideas which always characterise a passion carried to its height. But why are so affecting letters so often accompanied with an unimportant digression, an insipid criticism, or a self-contradicting paradox? Why, after having shone in all the energy of sentiment, does he on a sudden turn affecting? It is because none of the personages are truly interesting. That of St. Preux is weak, and often forced. Julia is an assemblage of tenderness and pity, of elevation of soul and of coquetry, of natural parts and pedantry. Wolmar is a violent man, and almost beyond the limits of nature. In fine, when he wishes to change his style, and adopt that of the speaker, it may easily be observed that he does not long support it, and every attempt embarrasses the author and cools the reader. In the Heloisa, Rousseau's vile talent of rendering every thing problematical, appears very conspicuous; as in his arguments in favour of and against duelling, which afford an apology for suicide, and a just condemnation of it: in his facility in palliating the crime of adultery, and his very strong reasons to make it abhorred: on the one hand, in declamations against social happiness; on the other, in transports in favour of humanity; here in violent rhapsodies against philosophers; there, by a rage for adopting their opinions: the existence of God attacked by sophistry, and atheists confuted by the most irrefragable arguments; the Christian religion combated by the most specious objections, and celebrated with the most sublime eulogies. But this has always been a favourite method of procedure with unbelievers. By affecting to give the strongest

reasonings on both sides of a question, and thus to enable a reader to weigh carefully before he decides, such a writer *naturally* takes care to give greater force to the sceptical side of an argument; and thus compels an unsuspecting reader, who is not aware of the design, to determine in favour of principles which he should abhor.

His Emilia afterwards made more noise than the New Heloisa. This moral romance, which was published in 1762, in four vols. 12mo., treats chiefly of education. Rousseau wished to follow nature in every thing; and of course, though the performance contains much that is valuable, it also contains much that is absurd, impracticable, or dangerous. Here again, conformably with his leading, though disguised, object, in affecting to educate a young man as a Christian, he has filled his third volume with objections against Christianity. He has, it must be confessed, given a very sublime eulogium on the gospel, and an affecting portrait of its divine Author: but the miracles, and the prophecies which serve to establish his mission, he attacks without the least reserve. Admitting only natural religion, he weighs every thing in the balance of reason; and this reason, being false, leads him into dilemmas very unfavourable to his own repose and happiness.

From the literary history of Rousseau and Voltaire, our readers may learn, that if a man of genius wishes to degrade, embase, and brutalize this glorious faculty, he has nothing to do but to adopt infidel notions: whereas, if he wish, enjoying such a requisite, still farther to exalt and ennoble his character, he has only to imitate such men as Pascal, Newton, and Euler.

The French parliament condemned Emilia in 1762, and entered a criminal prosecution against the author, which forced him to make a precipitate retreat. He directed his steps towards his native country, which shut its gates upon him. Proscribed in the place where he first drew breath, he sought an asylum in Switzerland, and found one in the principality of Neufchatel. His first care was to defend his Emilia against the mandate of the archbishop of Paris, by whom it had been anathemised. In 1763 he published a letter, in which he re-exhibits all his errors, set off with the most animated display of eloquence, and in the most insidious manner. In this letter he describes himself as "more vehement than celebrated in his researches, but sincere, on the whole, even against himself; simple and good, but sensible and weak; often doing evil, and always loving good; united by friendship, never by circumstances, and keeping more to his opinions than to his interests; requiring nothing of men, and not wishing to be under any obligation to them; yielding no more to their prejudices than to their will, and preserving his own as free as his reason; disputing about religion without licentiousness; loving neither impiety nor fanaticism, but disliking precise people more than bold spirits," &c. &c. From this specimen, the limitation he would appoint to this portrait may easily be discovered.

By the invitation of Mr. Hume he came, in 1766, to England, where he did not long remain, owing to his own strange capricious humour, which led him to think his best friends were his greatest enemies. He obtained leave to return to Paris, upon condition of never writing either upon religion or government. On the first of July 1770, Rousseau appeared, for the first time, at the Regency coffee-house, dressed in ordinary clothing, having for some time previous to this worn an Arminian habit. He was loaded with praises by the surrounding multitude. "It is somewhat singular (says M. Sennebier) to see a man so haughty as he, returning to the very place from whence he had been banished so often. Nor is it one of the smallest inconsistencies of this extraordinary character, that he preferred a retreat in that place of which he had spoken so much ill." It is as singular, that a person under sentence of imprisonment should wish to live in so public a manner in the very place where his sentence was in force against him. His friends procured for him, however, liberty of staying, on the conditions just specified. He died of an apoplexy, at Ermenon-ville, belonging to the marquis de Girardin, about ten leagues from Paris, July 2, 1778, aged 66 years. This nobleman has erected to his memory a very plain monument, in a grove of poplars, which constitutes part of his beautiful gardens. On the tomb are inscribed the following epitaphs:

Ici repose
L'Homme de la Nature
Et de la Verité!

Vitam impendere Vero *.
Hic jacent Ossa J. J. Rousseau.

* His motto.

ROUSSELART, a town of France, in the department of the North, 10 miles N.E. of Ypres, and 20 S.E. of Ostend. Lon. 3. 0 E. Lat. 50. 58 N.

ROUSILLON, a late province of France, 50 miles long and 25 broad; bounded on the E. by the Mediterranean, on the W. by Cerdagna, on the N. by Lower Languedoc, and on the S. by Catalonia, from which it is separated by the Pyrenees. See PYRENEES, EASTERN.

ROUT. *s.* (*rot*, Dutch.) 1. A clamorous multitude; a rabble; a tumultuous crowd (*Roscommon*). 2. (*route*, Fr.) Confusion of an army defeated, or dispersed (*Daniel*).

To ROUT. *v. a.* To dissipate and put into confusion by defeat (*Clarendon*).

To ROUT. *v. n.* To assemble in clamorous and tumultuous crowds (*Bacon*).

ROUTE. *s.* (*route*, Fr.) Road; way (*Gay*).

ROW. *s.* (*reih*, German.) A rank or file; a number of things ranged in a line (*Spenser*).

To ROW. *v. n.* (ropan, Saxon.) To impel a vessel in the water by oars (*Gay*).

To ROW. *v. a.* To drive or help forward by oars (*Milton*).

ROWE (Nicholas), an English poet, born

at Little Beckford, Bedfordshire, 1673. From Highgate school he went to Westminster, and at 16 removed to the Inner Temple. Though his abilities might have raised him to eminence in the law, he preferred literature, and at the age of 25 produced his first tragedy, The Ambitious Stepmother, received with universal applause. Tamerlane—the Fair Penitent—Ulysses—the Royal Convert—Jane Shore—and Lady Jane Grey, succeeded with equal approbation; but the poet was inadequate to the ease and sprightliness of comedy, and his Biter was so little popular, that it is not even inserted in his works. His fame made him known to the great: the duke of Queensberry made him his public secretary of state, and on the Hanoverian succession he was appointed poet laureat, and land surveyor of the customs of the port of London, &c. He died 6th December 1718, aged 45. He translated into verse Lucan's Pharsalia, and Quillet's Callipædia, and edited Shakspeare's plays. Rowe is still a popular poet on the stage, and his Jane Shore, as Johnson says, is always seen and heard with pity. Though he does not often excite terror, yet he elevates the sentiments; and though he seldom pierces the breast, he always delights the ear, and often improves the understanding.

Rowe (Elizabeth), a lady eminent for her writings, was the eldest daughter of Mr. Walter Singer, and was born at Ilchester, in Somersetshire, the 11th of September 1674. She was well educated, and had in her infancy a good taste in painting, poetry, and music. She began to write verses at twelve years of age, and was but twenty-two in 1696, when she published a collection of her poems. She had no other tutor for the French and Italian than the honourable Mr. Thynne, son to lord viscount Weymouth; and she improved so fast under his lessons, that in a few months she was able to read Tasso's Jerusalem with great ease. Her shining merit, and the charms of her person, procured her many admirers; but Mr. Thomas Rowe, an ingenious and learned gentleman, distinguished by the liveliness of his disposition, married her in 1710; but he died the 13th of May, 1715. She wrote a very tender elegy on his death, and continued till the last moments of her life to express the highest veneration and affection for his memory; and after that melancholy event, generally resided at Frome, in Somersetshire, where the greatest part of her estate lay, and where she lived in retirement, and devoted herself to study, to the exercises of religion, and charity. She seldom quitted her retreat, and when she did, it was in complaisance to some illustrious ladies, and particularly the countess of Hertford, between whom and herself there subsisted a tender friendship. Though she had all the personal graces and mental endowments that could be desired, she would never consent to a second marriage, and died suddenly at Frome, the 20th of February, 1737. A pious book was found lying open by her, and in her cabinet were found letters to several of her friends, which she had ordered to be delivered to those to whom they were directed, immediately after her decease. She wrote, 1. The History of Joseph, an heroic poem. 2. Friendship in Death, and Letters moral and entertaining. 3. Devout Exercises of the Heart, which the reverend Dr. Isaac Watts, according to her request, revised and published. 4. Miscellaneous Works, two volumes. This excellent lady, who was admired as much for her piety and many virtues, as her other accomplishments, was favoured with the esteem and acquaintance of many persons of the first distinction.

ROWEL. The small sharp-pointed star, moving upon a pivot at the heel of the spur, and which the horse, in breaking, is taught to obey.

Rowel, a kind of rude seton, of which the following judicious account is given by Mr. Clark, of Edinburgh.

"Rowels, for horses, answer the same purposes as issues in the human body. The method of introducing them is by making an incision through the skin, about three-eighths of an inch long, and then separating the skin from the flesh with the finger, or with a blunt horn, all round the orifice, as far as the finger will easily reach, then introducing a piece of leather, very thin, shaped round, about the size of a crown piece, having a large round hole in the middle of it. Previous to introducing the leather, it should be covered with lint or tow, and dipped in some digestive ointment; a pledget of tow, dipped in the same ointment, should likewise be put in the orifice, in order to keep out the external air. The parts around it soon swell, and this is followed with a plentiful discharge from the orifice, of yellowish serum or lymph; and in two or three days at most there discharges a thick gross white matter: the rowel is then said to suppurate.

"These artificial vents act by *revulsion* or *derivation*; and hence they become of great use in many cases, as they empty the surrounding vessels by a regular slow discharge of their contents, and are even of great service when there is a redundancy or fulness of humours in general, which may require a gradual discharge, in preference to greater evacuations by purging medicines, &c. Rowels should be placed (especially in some particular cases) as near the affected part as possible; and, at all times, they ought to have a depending orifice, in order to admit of a free discharge of the matter that may be contained in them.

"The parts in which they may be most conveniently inserted, and where they are found to answer the purpose best, are the belly, inside of the thighs, the breast, and outside of the shoulders and hips. They are sometimes, but very injudiciously, put in between the jaw-bones under the root of the tongue, where they never come to a proper suppuration, on account of the constant motion of the parts in eating, &c. neither do they answer any good purpose from being placed in that situation. In some disorders it is found necessary to put in several of them at once, in order to make a sudden determination from the parts affected;

but this should be regulated by the horse's age and strength, and by the circumstances that require their use.

"But, though rowels are found very beneficial in some cases, yet, like a number of other operations common to horses, they sometimes, by the improper use of them, become hurtful to the constitution, and, in some diseases, they frequently, instead of suppurating, become gangrenous. Hence, the cure proves worse than the disease they were intended to remove. Thus, in violent fevers, where they are frequently very injudiciously applied, they never suppurate properly. Whether this proceeds from the quickness of the pulse, together with the violent rapidity with which the fluids in general are then carried through the vessels, or from the violent agitation in which the whole system is thrown, it is difficult to determine; but experience confirms the fact. In such cases, the surrounding parts, where the rowel is placed, seldom or never swell (as in the ordinary course, when they suppurate properly), but appear dry, or much in the same state as when they were first put in; there is little or no discharge from the orifice, and the little that does come is thin, ichorous, and bloody. In such cases, they ought to be taken out immediately, and the parts well fomented with a strong infusion of chamomile, or an emollient poultice applied, if it can be properly fixed, and frequently repeated; and, provided there be no fever at the time, two or three ounces of Peruvian bark may be given through the day, either made into balls or given in a liquid; and this course should be continued till the threatening symptoms are removed."

To ROWEL. *v. a.* To pierce through the skin, and keep the wound open by a rowel (*Mortimer*).

RO'WEN. *s.* A field kept up till after Michaelmas, that the corn left on the ground may sprout into green (*Tusser*).

RO'WER. *s.* (from *row.*) One that manages an oar (*Addison*).

ROWLEY, a monk who is said to have flourished at Bristol in the 15th century, and to have been an author voluminous and elegant. Of the poems attributed to him, and published some time ago, various opinions have been entertained, which we have noticed elsewhere. They seem now to be almost forgotten. See CHATTERTON.

ROWLEY (William), who stands in the third class of dramatic writers, lived in the reign of king Charles I. and received his education at the university of Cambridge; but whether he took any degree there, is not evident; there being but few particulars preserved in regard to him, more than his close intimacy and connection with all the principal wits and poetical geniuses of that age, by whom he was well beloved, and with some of whom he joined in their writings. Wood styles him "the ornament, for wit and ingenuity, of Pembroke-hall, in Cambridge." In a word, he was a very great benefactor to the English stage, having, exclusive of his aid lent to Middleton, Day, Heywood, Webster, &c. left us five plays of his own composing, and one in which even Shakspeare afforded him some important assistance.

ROWLEY-RAG, in oryctology, a species of basalt, or of porphyry. See BASALTES and PORPHYRIUS.

ROXANA, the daughter of a Persian satrap, taken prisoner by Alexander. The conqueror became enamoured of her, and married her. She behaved with great cruelty after Alexander's death, and was at last put to death herself by Cassander's order.

ROXBURGH, a town and castle of Scotland, which gives name to a county. It is situate near the Tiviot, 19 miles S.W. of Berwick, and 32 S.E. of Edinburgh. Lon. 2. 47 W. Lat. 55. 46 N.

ROXBURGHSHIRE, a county of Scotland, sometimes called Teviotdale; bounded on the N. by Berwickshire, on the E. and S. by Northumberland and Cumberland, and on the W. by the shires of Dumfries and Selkirk. From N. to S. it extends 30 miles, and nearly the same from E. to W. The principal rivers are the Tweed, Tiviot, and Liddel. The face of the country exhibits a rough, irregular appearance of mosses, hills, and mountains, interspersed with narrow valleys, well watered, and fertile in corn. The hills feed great numbers of sheep and cattle.

ROXBURGHIA, in botany, a genus of the class octandria, order monogynia. Calyx inferior, four-leaved; corol four-petalled; nectary four subulate leaflets, inserted into the keel of the petals and connivent; anthers sessile, lodged in the groove formed by the keel of the petals; capsule one-celled, two-valved, many-seeded; seeds inserted into a spungy receptable. One species; a twining shrub of the East Indies.

ROY (Julian le), of Tours, was born at Tours in 1686, came to Paris at the age of 18, and so excelled in his profession, that his watches acquired the same celebrity in France, as those of Graham in England. He died at Paris, 1759, aged 74, leaving four sons. Peter, the eldest, was watchmaker to the king, and published Memoirs for the Clock-makers of Paris, 4to.—Etrennes Chronometriques—Treatise on the Labours of Harrison and le Roy, for the Discovery of Longitude at Sea, 4to.—Letter to M. de Marivetz. He died 1785. Julian David, another son, was member of the national institute, and professor of architecture. He travelled over Greece and other countries, and published Ruins of the finest Monuments of Greece, folio, a work of merit—History of the Construction of Christian Temples, 8vo.—Observations on the Edifices of the Ancients—on the Marine, Ships, Sails, &c. of the Ancients. He died of an apoplexy, 1803, aged 75.

It is well known that the English, on account of their numerous discoveries in this art, had enjoyed such a reputation for the excellence of their clocks and watches, that they universally found a market in preference to

any others, in all parts of the known world; and that the French themselves were obliged to purchase theirs in England. Julien le Roy had the honour of removing part of this pre-eminence, and of transferring it to the French artists. We must refer to the account itself given of him for the various means which he employed to effect this, as they would be superfluous here; and it will be sufficient to mention, in a few words, the principal discoveries which he made. His repeating clocks and watches; his improved second and horizontal clocks; his universal compass card with a sight; an extremely useful and simple contrivance for drawing a meridian line, and finding the declination of the needle; his clocks and watches of three parts, and his new universal horizontal dial. It is to him also that watch-makers are indebted for the method of compensating for the effects of heat and cold in the balances of chronometers, by the unequal expansion of different metals; a discovery of the greatest importance, which has been brought by our English artists to a state of perfection hardly credible, although it had been condemned and thrown aside by the inventor's son, M. Pierre Le Roy. See vol. xxvi. p. 200, of the Philosophical Magazine.

Such a number of things so happily invented, and executed, procured him the reputation of the first artist in his profession. The celebrated Graham once paid him the following compliment before several persons, when a repeater of Le Roy's was shown him by lord Hamilton. After having examined it for some time, he said, "I could wish I were younger, that I might work from this model." Which justice done to his merit by the first watch-maker in Europe at that time, was afterwards universaliy rendered him by all artists who had arrived to any degree of excellence in the art.

ROYAL, *regal*, something relating to a king.

The word is French, formed from the Latin *regalis*, of *rex*, king.

In this sense we say, the royal family, the royal blood, royal line, &c.

In England, the prince and princess of Wales, the king's brothers, &c. are addressed under the title of royal highness. The duchess of Savoy is called madame royale.

ROYALS, in artillery, are a kind of small mortars, which carry a shell, whose diameter is five inches and a half. See MORTAR.

ROYAL, in sea language, is a name given to the highest sail which is extended in any ship. It is spread immediately above the top-gallant-sail, to whose yard-arms the lower corners of it are attached. This sail is never used but in light and favourable breezes.

ROYAL EXCHANGE. The term royal, applied to the Exchange of London, originated with queen Elizabeth, a princess who, though tinctured with the arbitrary prejudices of her time, deserves the grateful remembrance of her countrymen for many wise and extremely beneficial acts, equally contributing to increase the political and commercial prosperity of England.

The word Exchange is certainly improperly applied to a building in which the act of exchanging or bartering takes place; but we are not the only people who thus misuse the appellation, as many towns on the continent have their Places de Change. We know nothing more of the Bourse (synonimous with Exchange) frequented by the merchants of London before the reign of Elizabeth, except that it was situated in Lombard-street. It is, however, reasonable to suppose, that it was too inconsiderable in its extent, or had become ruinous by that period, as sir Thomas Gresham then entertained thoughts of exerting his influence to render his fellow-citizens an essential service, and at the same time improve his own property.

It is singular, that a people celebrated for their commercial enterprize from the very foundation of their metropolis, should have proceeded through many centuries, contented with transacting their business at casual and uncertain meetings, when it seems so obvious to their posterity that a rallying point is absolutely necessary where a trader may, at a fixed and certain hour, see and converse with those connected with him in commerce, and meet with purchasers for his commodities.

There cannot exist a doubt, that numbers of the citizens of London felt the necessity for an established and convenient Exchange, which may be supposed from the faint attempt made in Lombard-street, and which might have suggested the plan afterwards executed by Gresham, whose very extensive concerns made him more particularly sensible of the deficiencies of London in this instance. The circumstances attending the founding of the original Exchange on the present scite, has contributed to convey all the honour of the undertaking to sir Thomas, when, in truth, he was only an active partner in that honour; as it is an indisputable fact, that the Corporation of London purchased, at the expense of the city, not less than eighty houses, and the ground on which they stood, for the sum of four thousand pounds: these they ordered to be taken down, and the earth prepared for building a magnificent structure.

It will be perceived from this statement, that the collective body of the citizens was by no means deficient in their wishes to second the views of Gresham, who engaged to erect the Exchange at his own expense, and the parties were mutually to enter into conveyances of the ground and building to each other, that their descendants and successors might for ever possess a joint and equal property in the subsequent profits of the concern. This covenant was faithfully complied with by the Corporation, but sir Thomas neglected to execute his part of it. Hence it must be admitted, that the latter has no claim to the exclusive gratitude of the natives of London; on the contrary, it is very evident, the patriotism of the act should be divided between the then

Lord Mayor, Aldermen, and Council, and Gresham; with this admission in his favour, that it is more than probable the Corporation would never of themselves have conferred an Exchange on the city they governed.

Sir Thomas laid the first stone of the edifice on the seventh day of June, 1566, which was completed with brick, and so contrived as to render the reimbursement of his expenses as certain as human foresight would permit. This he supposed might be accomplished by the fines and rents accruing from a very considerable number of vaults, and shops which inclosed the area intended for the ostensible purposes of the building. The novelty of this arrangement operated greatly in his favour, and the shops let rapidly; but the vaults, as our ancient writers term them, being partly under ground, and consequently equally dark and damp, were but partially occupied. Sensible of his mistake, and determined to retrieve it if possible, he resolved that his future tenants should take the vaults with the shops at eight marks per annum; and they proceeded thus for some time, till at length it was fully ascertained the public would not be compelled to descend to purchase commodities in the dark. The tenants, therefore, unanimously resolved to offer him four pounds per annum for the shop only, resigning all claims to the vaults. This the knight immediately accepted, and let them to merchants for the reception of packages, and large quantities of pepper, which article is still deposited in those of the present building.

While the projector of the Exchange employed every engine to increase his profits on its erection, neither himself nor his colleagues were inattentive to its original purpose; and they considered, that though it was impossible the merchants and traders of the city, and the foreigners who visited it, should not perceive the advantages it offered them, in the expediting their business, yet that they might be more firmly impressed on their minds, he had recourse to a stratagem which it was amply in his power to apply.

During the reigns of Edward VI. and queen Mary, this enterprizing merchant had been employed as their agent in procuring loans on the Continent, and had conducted himself with so much prudence and success, that queen Elizabeth entrusted him with similar commissions, particularly at Antwerp, where he procured her large sums. This method of proceeding did not, however, accord with the patriotic views of our great trader, who contrived to prevail upon the sovereign to apply to her own subjects for assistance, which he more than once afforded her himself with much profitable advice on financial matters. The stratagem alluded to was the prevailing on the queen to go in solemn procession to the new Exchange, and there proclaim it such, under the additional sanction of her royal protection and recommendation. Had this monarch been less attached to splendid exhibitions of regal state, the claims of sir Thomas on her gratitude were sufficiently powerful to demand a still greater favour. It is not, therefore, to be wondered at, that she readily consented to perform her part, particularly as it was intimately connected with the future welfare of her good city of London. Accordingly, after due preparation, her Majesty departed from Somerset-house, in the Strand, on the twenty-third of January, 1570, attended by the officers of her court and a train of nobility, to the magnificent residence of sir Thomas, who, at a very great expense, provided a most superb entertainment for his royal guest, her attendants, and the principal citizens; after which the whole party went to the new edifice, where every possible display of rich goods was made in the shops, the occupiers of which, delighted with the condescension of their queen, endeavoured to exceed each other in gratifying her curiosity, and expressing their loyalty and gratitude. The moment, at length, arrived for the accomplishment of this well-concerted plan; and sir Thomas and the citizens had the satisfaction of hearing a herald proclaim the place a Royal Exchange by the sound of trumpet, at the express command of her majesty.

It appeared sufficiently plain after the decease of sir Thomas Gresham, that he had not erred in his calculations on the probable profits of the Exchange, as it was known that his lady received 751*l.* 5*s.* per annum in rents from it. And this result is precisely what a generous citizen would wish, that public advantage should be attended with private benefit to the successors of a public benefactor. The difficulty attending procuring the perusal of the archives of the different institutions of London has hitherto prevented the historian from giving a sketch of the existing connection between the estate of sir Thomas Gresham held by the Company of Mercers and the City of London; but it is certain that, after the year 1596, all the affairs of sir Thomas Gresham's trust were managed by a committee of four aldermen and eight commoners on the part of the Corporation; and by the master, wardens, and eight of the court of assistants of the Mercers' Company.

The dreadful calamity of 1666 destroyed the old Royal Exchange, when only 234*l.* 8*s.* 2*d* belonging to the Gresham trust remained in the coffers of the Company; and yet the persons composing it contrived to employ labourers to remove the ruins within six months after the conflagration occurred, in order to prepare the ground for the present structure; and on the twenty-fifth of February the king was petitioned for a supply of Portland stone. In September, 1667, the committee appointed to superintend the rebuilding of the Exchange submitted their plans and elevations to the inspection of Charles II., at the same time re-requesting permission to project the south portico into Cornhill. They had soon the satisfaction of hearing that the first were highly approved of, and that their request was granted. On the twenty-third of October, in the above

year, the monarch went to the scite, and placed the base of the pillar on the west side of the north entrance, after which he accepted of a handsome entertainment provided at the joint expense of the City and Company of Mercers, and served under a temporary building erected on the Scotch walk. In return for this hospitality, the king knighted the sheriffs Ganden and Davis, and gave 20*l.* in gold to the workmen. James, duke of York, laid the first stone of the eastern pillar, on the thirty-first of October; and on the eighteenth of the following month prince Rupert placed that on the east side of the south entrance, each being entertained in a sumptuous manner.

The Committee, inspecting the plan made by Mr. Jerman, for rebuilding the Exchange, on the 9th of December, 1667, resolved "that porticos should be built on the north and south sides, according as his majesty desires, and as are described in the aforesaid draft; and that houses shall be built on the heads of the said porticos, and shops underneath." Mr. Malcolm has collected many particulars relating to this noble edifice, in his Londinium Redivivum, and amongst others, the following extract from a book produced to a Committee of the House of Commons, 1747. "The said book begins the 27th of October, 1666, and ends July 12, 1676; and it thereby appears that the total expense of rebuilding the Royal Exchange amounted unto 58,962*l.*; the Company's moiety whereof was the sum of 29,481*l.* To defray which expense, it appeared the Company were obliged to borrow money upon their seal, insomuch that in the year 1682, they had taken up money on their bonds, on account of the trust of sir Thomas Gresham, to the amount of 45,795*l.*" It appeared, on this occasion, from the evidence of a Mr. Crumpe, "that the company had hitherto contributed equally with the city in the repairing of the Royal Exchange, and paying sir Thomas Gresham's lectures and charities; and that, in or about the year 1729, one of the lecturers of sir Thomas Gresham filed a bill, in Chancery, against the City of London, and the Mercer's Company; to answer which, it became necessary to draw out and state an account between the Mercers' Company and sir Thomas Gresham's trust estates, as also between the City and Company and the said estate; and accordingly, such accounts were drawn up: and thereby it appears, that there was due to the Mercers' Company, for their moiety of the expense of building the Royal Exchange, and other payments up to that time, the sum of 100,659*l.* 18*s.* 10*d.*" Mr. Cawne, the then clerk of the company of Mercers, produced a continuation of this account to the Committee above-mentioned, down to 1745, when the principal and interest amounted to the enormous sum of 142, 885*l.* 7*s.* 1*d.*

In the year 1767, it was represented to the Legislature that essential repairs were required in different parts of the Royal Exchange, which procured a grant of 10,000*l.*, and these were completed under the direction of Mr. Robinson, surveyor, who thought proper to rebuild the west side.

During the time occupied in rebuilding the present structure, the merchants of London transacted their business at Gresham college; and the new building was opened for that purpose, September 28, 1669: in 1703, the following notice appeared in the public papers: "An act of the Lord Mayor and Court of Aldermen is affixed at the Exchange, and other places in this city, by which all persons are prohibited coming upon the Royal Exchange to do business before the hours of twelve o'clock, and after the hour of two, till evening change. Wherein it is further enacted, that for a quarter of an hour before twelve the Exchange bell shall ring, as a signal of change time; and shall also begin to ring a quarter of an hour before two, at which time the change shall end: and all persons shall quit it, upon pain of being prosecuted to the utmost according to law. That the gates shall then be shut up, and continue so till evening change time; which shall be from the hours of six to eight from Lady-day till Michaelmas, and from Michaelmas to Lady-day from the hours of four to six; before and after which hours the bell shall ring as above said. And it is further enacted, that no persons shall assemble in companies, as stock-jobbers, &c. either in Exchange-alley, or places adjacent, to stop up and hinder the passage from and to the respective houses thereabouts, under pain of being immediately carried before the lord-mayor or other justice of the peace, and prosecuted."

There are at present numerous shops encircling the Royal Exchange, but they are confined to the ground floor, under the arches or piazza; many years past the upper rooms were used for this purpose, and it has been said to the amount of two hundred. Lloyd's coffee-house and an assurance office now occupy part of the upper story.

The architectural decorations render the exterior and interior fronts of the Royal Exchange an ornament to the vast metropolis of England. The form is square, and the area the same; there are four gates which face the cardinal points, but the principal is in Cornhill. Mr. Malcolm informs us that the statues of George I. and George II. are by Rysbrack; his present majesty's by Wilton, which was erected in March, 1764; and that most of the kings previously to Charles II. were sculptured by Cibber; that of the latter king, which originally stood in the area, is the work of Grinlin Gibbons, the unrivalled carver in wood; those of Charles I. and II., on the principal front, are by Bushnell. The statue of Charles II., in the area, was a few years since replaced by another in a Roman habit, the performance of Mr. Spiller. We shall conclude this slight sketch of the history of the Royal Exchange, with a brief description by the author just mentioned. The grand gateway is in the centre intercolumniation of four Corinthian pillars, which are the whole height of the front,

and have a complete entablature, the great arch reaching to the architrave. In the attic, directly over the gate, are the royal arms, and this forms the base of the steeple, on which there are three gradations, or stories, each bounded by pilasters and pillars, with entablatures and balustrades, and busts in place of vases, the usual ornaments of this sort of magnificent edifices; except the third, which has pediments on each side, with a cupola arising from the centre. On this is a globe and gilt grasshopper.

Over each side intercolumniation of the front are circular pediments, above them are attics and balustrades, with the Mercers crest and the City supporters. The lesser entrances have divided pediments, and over them Corinthian niches, and pediments containing statues of kings Charles the First and Second. The wings of the front are five arches in length, on each side of the gates, three of these form a piazza; the two remaining retire into the main building. The basement in which they are turned is rustic, and the story above them Corinthian, with four pillars, an entablature, and balustrade. The three windows of the projection, and those of the building, are exactly attic in their borders, though placed in Corinthian intercolumniations. The four sides of the quadrangle are magnificent, and richly decorated with the basement arches of the walks, the cornices over them, the niches, statues, pillars, circular windows, entablatures, and balustrade, all in correct proportion and arrangement.

ROYAL OAK, a fair spreading tree at Boscobel, in the parish of Donnington, in Staffordshire, the boughs whereof were once covered with ivy; in the thick of which king Charles II. sat in the day-time with colonel Careless, and in the night lodged in Boscobel-house: so that they are mistaken who speak of it as an old hollow oak; it being then a gay flourishing tree, surrounded with many more. The poor remains thereof are now fenced in with a handsome wall, with this inscription in gold letters: *Felicissimam arborem quam in asylum potentissimi regis Caroli II. Deus op. max. per quam reges regnant, hic crescere voluit*, &c.

ROYAL OAK, *Robur Carolinum*, in astronomy, one of the new southern constellations, the stars of which, according to Sharp's catalogue, annexed to the Britannic, are 12. viz. 0, 1, 2, 7, 2, 0, arranged according to their magnitudes.

ROYAL SOCIETY OF ENGLAND, is an academy or body of persons, supposed to be eminent for their learning, instituted by king Charles II., for promoting natural knowledge.

This learned and scientific body originated from an assembly of ingenious men, residing in London, who, being inquisitive into natural knowledge, and the new and experimental philosophy, agreed, about the year 1645, to meet weekly on a certain day, to discourse upon such subjects. These meetings, it is said, were suggested by Mr. Theodore Haak, a native of the palatinate in Germany; and they were held sometimes at Dr. Goddard's lodgings in Wood-street, sometimes at a convenient place in Cheapside, and sometimes in or near Gresham college. This assembly seems to be that mentioned under the title of the *Invisible, or Philosophical College*, by Mr. Boyle, in some letters written in 1646 and 1647. About the years 1648 and 1649, the company which formed these meetings began to be divided, some of the gentlemen removing to Oxford, as Dr. Wallis, and Dr. Goddard, where, in conjunction with other gentlemen, they held meetings also, and brought the study of natural and experimental philosophy into fashion there; meeting first in Dr. Petty's lodgings, afterwards at Dr. Wilkins's apartments in Wadham college, and, upon his removal, in the lodgings of Mr. Robert Boyle; while those gentlemen who remained in London continued their meetings as before. The greater part of the Oxford society coming to London about the year 1659, they met once or twice a week in term-time at Gresham college, till they were dispersed by the public distractions of that year, and the place of their meeting was made a quarter for soldiers. Upon the restoration, in 1660, their meetings were revived, and attended by many gentlemen, eminent for their character and learning.

They were at length noticed by the government, and the king granted them a charter, first the 15th of July 1662, then a more ample one the 22d of April 1663, and thirdly the 8th of April 1669; by which they were erected into a corporation, consisting of a president, council, and fellows, for promoting natural knowledge, and endued with various privileges and authorities.

Their manner of electing members is by balloting; and two-thirds of the members present are necessary to carry the election in favour of the candidate. The council consists of twenty-one members, including the president, vice-president, treasurer, and two secretaries; ten of which go out annually, and ten new members are elected instead of them, all chosen on St. Andrew's day. They had formerly also two curators, whose business it was to perform experiments before the society.

Each member, at his admission, subscribes an engagement, that he will endeavour to promote the good of the society; from which he may be freed at any time, by signifying to the president that he desires to withdraw.

The charges are five guineas paid to the treasurer at admission; and one shilling per week, or 52 *s.* per year, as long as the person continues a member; or, in lieu of the annual subscription, a composition of 25 guineas in one payment.

The ordinary meetings of the society are once a week, from November till the end of Trinity term the next summer. At first, the meeting was from three o'clock till six afternoon. Afterwards, their meeting was from

six till seven in the evening, to allow more time for dinner, which continued for a long series of years, till the hour of meeting was removed, by the present president, to between eight and nine at night, that gentlemen of fashion, as was alleged, might have the opportunity of coming to attend the meetings after dinner.

Their design is to "make faithful records of all the works of nature or art, which come within their reach; so that the present, as well as after ages, may be enabled to put a mark on errors which have been strengthened by long prescription; to restore truths that have been long neglected; to push those already known to more various uses; to make the way more passable to what remains unrevealed, &c."

To this purpose they have made a great number of experiments and observations on most of the works of nature; as eclipses, comets, planets, meteors, mines, plants, earthquakes, inundations, springs, damps, fires, tides, currents, the magnet, &c.: their motto being *Nullius in Verba*. They have registered experiments, histories, relations, observations, &c., and reduced them into one common stock. They have, from time to time, published some of the most useful of these, under the title of Philosophical Transactions, &c. usually one volume each year, which were, till lately, very respectable, both for the extent or magnitude of them, and for the excellent quality of their contents. The rest, that are not printed, they lay up in their registers.

They have a good library of books, which has been formed, and continually augmenting, by numerous donations. They had also a museum of curiosities in nature, kept in one of the rooms of their own house in Crane-court, Fleet-street, where they held their meetings, with the greatest reputation, for many years, keeping registers of the weather, and making other experiments; for all which purposes those apartments were well adapted. But, disposing of these apartments, in order to remove into those allotted them in Somerset-place, where having neither room nor convenience for such purposes, the museum was obliged to be disposed of, and their useful meteorological registers discontinued for many years, though they have lately been resumed.

Sir Godfrey Copley, bart. left five guineas to be given annually to the person who should write the best paper in the year, under the head of experimental philosophy: this reward, which is now changed to a gold medal, is the highest honour the society can bestow; and it is conferred on St. Andrew's day.

A History of the Royal Society has lately been published by Dr. Thomson, in one volume quarto.

ROYAL SOCIETY OF EDINBURGH. See SOCIETY.

RO'YALIST. *s.* (from *royal.*) Adherent to a king (*South*).

To RO'YALIZE. *v. a.* (from *royal.*) To ake royal (*Shakspeare*).

RO'YALLY. *ad.* (from *royal.*) In a kingly manner; regally; as becomes a king (*Dryden*).

RO'YALTY. *s.* (*roialté*, French.) 1. Kingship; character or office of a king (*Locke*). 2. State of a king (*Prior*). 3. Emblems of royalty (*Milton*).

ROYAN, once a large town of France, in the department of Lower Charente, famous for a siege maintained by the Huguenots against Lewis XIII. in 1622. It is now almost in ruins, and is seated at the mouth of the Garonne, 30 miles S. of Rochelle. Lon. 0. 57 W. Lat. 45. 38 N.

ROYENA. Bladder-nut. In botany, a genus of the class decandria, order digynia. Calyx cup-shaped; corol one-petalled, with a revolute border; capsule one-celled, four-valved. Seven species; herbs of the Cape; four of which are cultivated in the green-houses of our own country.

ROYES, a strong town of France, in the department of Somme. Some mineral waters were discovered here a few years ago. It is 12 miles N.W. of Noyon, and 60 N. by E. of Paris. Lon. 2. 51 E. Lat. 49. 46 N.

To ROYNE. *v. a.* (*rogner*, French.) To gnaw; to bite (*Spenser*).

RO'YNISH. *a.* (*rogneux*, French.) Paltry; sorry; mean; rude (*Shakspeare*).

ROYSTON, a town in Herts (part of which is in Cambridgeshire) with a market on Wednesday. Under the market-place is an ancient subterranean chapel, supposed to be of Saxon construction. Royston has given its name to a species of crow, called also the Hooded or Gray crow, which is a bird of passage in this neighbourhood, and also on the whole eastern coast. It is 15 miles S. by E. of Huntingdon, and 37 N. of London. Lon. 0. 1 E. Lat. 52. 6 N.

RO'YTELET. *s.* (French.) A little or petty king (*Heylin*).

ROZÉE (Mademoiselle), an extraordinary female painter, was born at Leyden, in 1632. It is said that she neither used oil nor water-colours in her performances, but only worked on the rough side of the pannel with a preparation of silk floss, disposed in different boxes, according to the different degrees of the bright and dark tints, out of which she applied whatever colour was requisite for her work, and blended, softened, and united the tints with such art and judgment, that she imitated the warmth of flesh as well as could be done with oil. Her pictures were exquisitely beautiful, and curious, some being historical subjects, others landscapes, and some portraits. She died in 1682.

To RUB. *v. a.* (*rhubio*, Welsh; *rieben*, German, to wipe.) 1. To clean or smooth any thing by passing something over it; to scour; to wipe; to perfricate. 2. To touch so as to leave something of that which touches behind (*Addison*). 3. To move one body upon another (*Arbuthnot*). 4. To obstruct by collision (*Shakspeare*). 5. To polish; to retouch (*South*). 6. To remove by friction

(*Collier*). 7. To touch hard (*Sidney*). 8. *To* RUB *down*. To clean or curry a horse (*Dryden*). 9. *To* RUB *up*. To excite; to awaken (*South*). 10. *To* RUB *up*. To polish; to refresh.

To RUB. *v. n.* 1. To fret; to make a friction (*Dryden*). 2. To get through difficulties (*L'Estrange*).

RUB. *s.* (from the verb.) 1. Friction; act of rubbing. 2. Inequality of ground, that hinders the motion of a bowl (*Shakspeare*). 3. Collision; hinderance; obstruction (*Dryden*). 4. Difficulty; cause of uneasiness (*Shakspeare*).

RUB-STONE. *s.* (*rub* and *stone*.) A stone to scour or sharpen (*Tusser*).

RU'BBER. *s.* (from *rub*.) 1. One that rubs. 2. The instrument with which one rubs (*Swift*). 3. A coarse file (*Moxon*). 4. A game; a contest; two games out of three (*Collier*). 5. A whetstone (*Ainsworth*).

RUBBER (Indian.) See CAOUTCHOUC.

RU'BBISH. RU'BBAGE. *s.* (from *rub*: as perhaps meaning, at first, dust made by rubbing. *Rubbage* is not used.) 1. Ruins of a building; fragments of matter used in building (*Shakspeare. Wotton*). 2. Confusion; mingled mass (*Arbuthnot*). 3. Any thing vile and worthless.

RUBE'DO, in medicine, a diffused, but not spotted, redness in any part of the skin; such as that which arises from blushing.

RUBEFACIENTS. (*rubefacientia*; from *rubefacio*, to make red.) Those substances which, when applied a certain time to the skin, induce a redness without blistering.

RUBENS (Sir Peter Paul), a famous painter, born at Cologne, in 1757. He studied first at Antwerp, and then went to Venice, where, in the school of Titian, he greatly improved himself. He afterwards went to Rome, where he contemplated the antiques and the paintings of Raphael. His reputation soon spread over Europe, when queen Mary of Medicis, wife of Henry IV. of France, invited him to Paris, and there he painted the Luxemburg galleries. The duke of Buckingham recommended him to the infanta Isabella, who sent him in 1630 ambassador to England, to negociate a peace with Charles I. He concluded this treaty, and painted the banqueting-house, for which the king paid him largely, and knighted him. He continued in the dissimilar functions of statesman and painter many years, by which he amassed vast wealth; and died in 1640.

Rubens's genius qualified him to excel equally in every thing that can enter into the composition of a picture. His invention was so fertile, that, if he had occasion to paint the same subject several times, his imagination always supplied him with something striking and new. The attitudes of his figures are natural and varied, the carriage of the head is peculiarly graceful, and his expression noble and animated. He is by all allowed to have carried the art of colouring to its highest pitch; he understood so thoroughly the true principles of the chiaro-scuro, that he gave to his figures the utmost harmony, and a prominence resembling real life. His pencil is mellowed, his strokes bold and easy, his carnation glows with life, and his drapery is simple, but grand, broad, and hung with much skill. The great excellence of Rubens appears in his grand compositions; for, as they are to be viewed at a distance, he laid on a proper body of colours with uncommon boldness, and fixed all his tints in their proper places; so that he never impaired their lustre by breaking or torturing them; but touched them in such a manner as to give them a lasting force, beauty, and harmony.

It is generally allowed that Rubens wanted correctness in drawing and designing; some of his figures being heavy and too short, and the limbs in some parts not being justly sketched in the outline. Though he had spent seven years in Italy in studying those antiques by which other celebrated artists had modelled their taste; though he had examined them with such minute attention as not only to perceive their beauties, but to be qualified to describe them in a dissertation which he wrote on that subject; yet he seems never to have divested himself of that heavy stile of painting, which, being peculiar to his native country, he had insensibly acquired. The astonishing rapidity too with which he painted made him fall into inaccuracies, from which those works that he finished with care are entirely exempted.

Among his finished pieces may be mentioned the Crucifixion of Jesus Christ between the two Thieves, which was very lately to be seen at Antwerp; but of all his works the paintings in the palace of Luxemburg best display his genius and his style.

It is the observation of Algarotti, that he was more moderate in his movements than Tintoretto, and more soft in his chiaro-scuro than Carravaggio; but not so rich in his compositions, nor so light in his touches, as Paolo Veronese; in his carnations less true than Titian, and less delicate than Vandyck. Yet he contrived to give his colours the utmost transparency and harmony, notwithstanding the extraordinary deepness of them; and he had a strength and grandeur of style entirely his own.

RUBE'OLA. (*rubeola*, from *ruber*, red; from *rubio*, to become red.) Morbili. The measles. A genus of diseases in the class pyrexiæ and order exanthemata of Cullen; known by synocha, hoarseness, dry cough, sneezing, drowsiness; about the fourth day, eruption of small red points, discernible by the touch, which after three days end in mealy desquamation. The blood after venæsection exhibits an inflammatory crust. In addition to the symptoms already related, it is remarkable, that the eyes and eye-lids always shew the presence of this disease, being somewhat inflamed and suffused with tears. The synocha continues during the whole progress of the disease.

RUBIA. Madder. In botany, a genus of the class tetrandia, order monogynia. Corol one-petalled, campanulate, superior; berries two, one-seeded. Seven species, scattered over the globe; one, R. peregrina, common to the hedges of our own country.

The only cultivated species is R. tinctorum, Dyer's madder. Root perennial; stalk annual, prickly, square, prominent, jointed; leaves annual in fours, lanceolate, pointed, rough, fringed; flowers yellow, in four segments, resembling stars. They appear in June, and are sometimes succeeded by seeds that seldom ripen in England. It derives its specific name from its great utility in dyeing. See the articles DYEING and CALICO PRINTING.

The roots of the plant have a bitterish somewhat austere taste, and a slight smell, rather disagreeable. These roots were formerly considered as deobstruent, detergent, and diuretic; but they are now seldom used in medicine. The bones of animals that feed upon the root become tinged with the red colour of the root; yet neither the fleshy nor the cartilaginous parts of the animal frame are in the least affected by the colour. The soil proper for madder should be deep and light, and should be deeply and thoroughly ploughed in autumn, as soon as the crop is off, with a four-coultered plough. In about three months afterwards, let the ground be ploughed a second time, with the same plough, and a third time about the end of March; then about the end of April, or in May, let the young shoots from the sides of the root be taken off from the mother-plant, with as much root as possible, and planted with an iron dibble, in rows at a foot distance from one another. When one row is planted, the line is to be removed a foot and a half, and another row planted. The sets in this not being placed opposite to those in the other, but just over-against the middle of the spaces between: the line is then to be removed to the distance of five feet, and drawn straight over the ground, as before, and a row of the sets are to be planted there: thus there will be a third row at five feet distance from the second, and at six and a half from the first; the line is then to be moved again one foot and an half; and another, being a fourth row, is to be planted opposite the middle distances of the last; and in this manner the whole ground is to be planted out. If the season should prove dry after planting, the sets must be watered, and after the plants appear, let them be carefully weeded, and the growth of their roots promoted.

There are different ways of managing the root when taken up, and different forms in which it is brought to market. It may be dried in a hop-kiln, with a little fire.

RUBICAN colour of a horse; a bay, sorrel, or black, with a light grey or white upon the flanks, but so that the grey or white be not predominate in those parts.

RUBICON, a small river of Italy, which it separates from Cisalpine Gaul. It rises in the Apennine mountains, and falls into the Adriatic sea. By crossing it, then the boundaries of his province, J. Cæsar began the civil wars against the senate and Pompey.

RU'BICUND. *a.* (*rubiconde*, Fr. *rubicundus*, Latin.) Inclining to redness.

RU'BIED. *a.* (from *ruby*.) Red as a ruby (*Milton*).

RUBI'FIC. *a.* (*ruber* and *facio*, Latin.) Making red (*Grew*).

RU'BIFORM. *a.* (*ruber*, Latin, and *form*.) Having the form of red (*Newton*).

To RU'BIFY. *v. a.* To make red (*Brown*).

RUBIGO, a goddess at Rome, particularly worshipped by husbandmen, as she presided over corn. Her festivals, called Robigalia, were celebrated on the 25th of April, and incense was offered to her, as also the entrails of a sheep, and of a dog. She was intreated to preserve the corn from blights.

RUBIGO, in botany, the rust or red mildew, frequently seen on the stems and leaves of plants. It consists of yellow or brown stains, which when touched give out a powder of the same colour, and equally soiling. Microscopical observation has shown that this rust-like matter proceeds from small fungi called æcidium, the seeds of which constitute it. We find it peculiarly frequent in the leaves and stems of euphorbia cyparissias; barberis vulgaris; rhamnus catharticus, and in the spikes or culms of wheats, oats, and other grain. See ÆCIDIUM.

RUBIGO FERRI. Chalybis rubigo præparata. Rust of iron. This is a yellow oxyd of iron, and therefore termed oxydum ferri luteum in the chemical nomenclature. It possesses corroborant and stimulating properties, and is exhibited with success in leucorrhæa, ataxia, asthenia, chlorosis, pyrosis, dyspepsia, rachitis, &c.

RU'BIOUS. *a.* (*rubeus*, Latin.) Ruddy; red: not used (*Shakspeare*).

RU'BRICATED. *a.* (from *rubrica*, Latin.) Smeared with red.

RU'BRIC. *s.* (*rubrique*, Fr. *rubrica*, Lat.) Directions printed in books of law and in prayer books; so termed, because they were originally distinguished by being in red ink (*Stillingfleet*).

RU'BRIC. *a.* Red (*Newton*).

To RU'BRIC. *v. a.* (from the noun.) To adorn with red.

RUBUS. Bramble. In botany, a genus of the class icosandria, order polygynia. Calyx five-cleft; petals five; berries superior, composed of several single-seeded granulations. Thirty-two species: chiefly natives of Europe and America; seven common to the woods, hedges, or mountains of our own country. Of these some are shrubby, others herbaceous. The following are cultivated.

1. R. idæus. Raspberry. A well-known shrub; peduncles hispid; flowers in panicles; fruit red, grateful to the smell and taste, bristly. Numerous varieties: found wild in our own hedges.

2. R. occidentalis. Virginian raspberry. Higher than the preceding; stalks purplish; flower ornamental; fruit a dark black when

ripe, little flavour. It varies with a red fruit more acid and pleasant than the European raspberry.

3. R. odoratus. Flowering raspberry. Perennial creeping root; six or seven feet high; petals largish, light purple; fruit rarely produced here, but the common raspberry of North America; not so pleasant as the European.

4. R. fruticosus. Common bramble. Blackberry. Well known to every one: the cultivated variety is the double-flowering, or double blossomed bramble, which is highly ornamental in our gardens.

5. R. trispidus. Bristly bramble: stem and petioles very rough, with stiff lanceolate bristles. A native of Canada.

6. R. cœsius. Dewberry. Fruit black, with a bright blue tinge or bloom, composed of few large grains: flavour agreeably acid, without the faint taste of R. fruticosus. A native of our own woods.

7. R. arcticus. Dwarf crimson bramble. Stems from a hand to a span in height, upright, simple, angular: flowers solitary, peduncled, terminal, deep-rose-coloured: fruit purple, sweet, fragrant: found on the stony hills of our own country.

8. R. chamœmorus. Cloud-berry; mountain bramble. Elegant; with a creeping root; simple stem, hardly a foot high, upright; mallow-like leaves; flowers terminal, peduncled, white; berry of a tawny or dull orange colour; a native of our own mountains.

The two last are best propagated by seeds; the rest by cuttings, suckers, layers, and division of the roots. The first is chiefly cultivated. The new plants should be placed two feet asunder, and set in rows, which should be five feet distant from one another. The soil they thrive in best is a fresh sandy loam, which should neither be too moist nor over dry. The time for dressing them is October, when all the old wood which produced fruit the preceding summer should be cut down to the ground, and the young shoots shortened to about two feet in length. The spaces between the rows should then be dug up, and some rotten dung buried in them. In the summer they must be kept clean from weeds, and once in three or four years there should be new beds made, and the old ones destroyed, for they seldom bear well after that time.

RUBY, in mineralogy, a species of silicious earth. See GEMMA. Ruby denotes, 1. Redness (*Shakspeare*). 2. Any thing red (*Milton*). 3. A blain; a blotch; a carbuncle (*Jones*).

RUBY. *a.* (from the noun.) Of a red colour (*Shakspeare*).

RUCTA'TION. *s.* (*ructo*, Latin.) A belching arising from wind and indigestion.

RUCTUS, in medicine, ructation, eructation.

RUD, in ichthyology. See CYPRINUS.

RUDAW, a town of Prussia, remarkable for the victory obtained by the knights of the Teutonic Order in 1370, over Kinstud, great duke of Lithuania; in memory of which a stone pillar was erected, which is still remaining. It is 12 miles N.N.W. of Konigsberg.

RUDBECHIA, in botany, a genus of the class syngenesia, order polygamia frustranea. Receptacle chaffy, conic; seeds crowned with a four-toothed margin; calyx a double row of scales. Nine species, American plants, five or six of which are cultivated, and afford ornament and variety in the borders and clumps of our gardens.

RUDDER, in navigation, a piece of timber turning on hinges in the stern of a ship; and which opposing sometimes one side to the water, and sometimes another, turns or directs the vessel this way or that.

The rudder becomes gradually broader, in proportion to its distance from the top, or to its depth under water. The back, or inner part of it, which joins to the stern-post, is diminished into the form of a wedge through its whole length, so as that the rudder may be the more easily turned from one side to the other, where it makes an obtuse angle with the keel. The hinges, which are bolted round the stern-post to the after extremity of the ship, are called googings, and are furnished with a large hole on the after-part of the stern-post. The other parts of the hinges, which are bolted to the back of the rudder, are called pintles, being strong cylindrical pins, which enter into the googings, and rest upon them. The length and thickness of the rudder are nearly equal to those of the stern-post. The rudder is turned upon its hinges, by means of a long bar of timber, called the tiller, the operation of which is directed by the tiller-rope, which in large vessels is wound about a wheel. The power of the rudder is reducible to that of the lever, and the oblique action of the water upon it is to be determined by the resolution of forces. As to the most advantageous angle made by the helm, with the line prolonged from the keel, geometricians have fixed it at 54° 44′. But it has been said, that, in determining this angle, they have presumed that the ship is as narrow at her floating line, or at the line described by the surface of the water round her bottom, as at the keel; whereas all vessels increase in breadth from the keel upward to the extreme breadth, where the floating line, or the highest water-line, is terminated; and, therefore, the angle above stated is too large. For the rudder is impressed by the water, at the height of the floating line, more directly than at the keel, because the fluid exactly follows the horizontal outlines of the bottom; so that a particular position of the helm might be supposed necessary for each different incidence which it encounters from the keel upwards. But as a middle position may be taken between all these points, it will be sufficient to consider the angle formed by the sides of the ship, and her axis, or the middle line of her length, at the surface of the water, in order to determine afterwards the mean point, and the mean angle of incidence. The angle 54° 44′, it is said, is too open, and very unfavourable to the ship's head-way, because the water acts

upon the rudder there with too great a sine of incidence, as being equal to that of the angle which it makes with the line prolonged from the keel below; but above, the shock of the water is almost perpendicular to the rudder, because of the breadth of the bottom. If then the rudder is only opposed to the fluid, by making an angle of 45° with the line prolonged from the keel, the impression, by becoming weaker, will be less opposed to the ship's headway, and the direction of the absolute effort of the water upon the helm drawing nearer to the lateral perpendicular, will be placed more advantageously. To which it is added, that experience daily testifies, that a ship steers well, when the rudder makes the angle of 35°. L. Euler recommends an obliquity somewhat less than 54° 44′, for the greatest action of the rudder, and says, if we wish to know this angle more exactly, we have only to find an angle $n=\frac{1}{3}$ cos. k, (k being the angle between the direction of the keel and that of the water), and then make the required angle $q=90-\frac{1}{2}(n+k)$. Moreover, he remarks, since the leeway ϕ seldom surpasses 20 degrees, by taking $k=\frac{1}{2}\phi$, this expression will not deviate considerably from the truth: therefore, since k does not surpass 10 degrees; it is obvious that there could not result any sensible error whenever this angle should be taken a few degrees greater or less. Thus, by taking $k=10°$, we find $n=70°\ 50'$, and $q=49°\ 35'$. The force of the water upon the rudder moving with the velocity c, will be denoted by $\frac{c^2 \cos.^2 k}{4g} f^2.\sin.^2(q+k)$

f^2 denoting the surface of the rudder, and g as usual $16\frac{1}{12}$ feet. Bouguer Traite de la Manœuvre des Vaisseaux. Falconer's Marine Dict. article Helm; and Euler's Complete Theory of the Construction and Properties of Vessels, translated by colonel Watson, 1776, book ii chap. vii. viii. ix.

A narrow rudder is best for a ship's sailing, provided she can feel it, that is, be guided and turned by it; for a broad rudder will hold much water when the helm is put over to any side; but if a ship have a fat quarter, so that the water cannot come quick and strong to her rudder, she will require a broad rudder.

Captain Bolton has taken out a patent for an improved rudder, the description of which is given in the 16th vol. of the first series of the Repertory of Arts, &c. The invention consists in fixing the rudder, so that when the vessel touches the ground, &c. it will rise of itself, or may be lifted at will by any of the ordinary mechanical powers.

RUDDIMAN (Thomas), a learned Scotchman, born in 1684. He was near fifty years keeper of the advocates library in Edinburgh; and published several works of profound erudition. In 1737 he was employed to complete the Diplomata et Numismata Scotiæ, the preface to which is deemed a master-piece of the kind. He died in 1767.

RU'DDINESS. *s.* (from *ruddy*.) The quality of approaching to redness (*Wiseman*).

RU'DDLE. *s.* (*rudul*, Islandick.) Red earth (*Woodward*).

RU'DDOCK. *s.* (*rebecula*, Latin.) A bird; the redbreast. See MOTACILLA.

RU'DDY. *a.* (ꝛuꝺu, Saxon.) 1. Approaching to redness; pale red (*Otway*). 2. Yellow (*Dryden*).

RUDE. *a.* (ꝛeꝺe, Saxon; *rudis*, Latin.) 1. Untaught; barbarous; savage (*Wilkins*). 2. Rough; coarse of manners; uncivil; brutal (*Shakspeare*). 3. Violent; tumultuous; boisterous; turbulent (*Boyle*). 4. Harsh; inclement (*Waller*). 5. Ignorant; raw; untaught (*Wotton*). 6. (*rude*, Fr.) Rugged; uneven; shapeless; unformed (*Chapman*). 7. Artless; inelegant (*Spenser*). 8. Such as may be done with strength without art (*Dryden*).

RUDELSTADT, a town of Upper Saxony, in the landgravate of Thuringia, and county of Schwartzburg, with a castle, near the river Sala.

RU'DELY. *ad.* 1. In a rude manner; fiercely (*Shakspeare*). 2. Without exactness; without nicety; coarsely (*Shakspeare*). 3. Unskilfully (*Dryden*). 4. Violently; boisterously (*Spenser*).

RU'DENESS. *s.* (*rudesse*, French; from *rude*.) 1. Coarseness of manners; incivility (*Swift*). 2. Ignorance; unskilfulness (*Hayward*). 3. Artlessness; inelegance; coarseness (*Spenser*). 4. Violence; boisterousness (*Shakspeare*). 5. Storminess; rigour (*Evelyn*).

RU'DENTURE. *s.* (French.) In architecture, the figure of a rope or staff, wherewith the flutings of columns are frequently filled up (*Bailey*).

RU'DERARY. *a.* (*rudera*, Latin.) Belonging to rubbish.

RUDERA'TION. *s.* In architecture, the laying of a pavement with pebbles or little stones (*Bailey*).

RU'DESBY. *s.* (from *rude*.) An uncivil turbulent fellow. A low word (*Shakspeare*).

RU'DIMENT. *s.* (*rudimentum*, Latin.) 1. The first principles; the first elements of a science (*Milton*). 2. The first part of education (*Wotton*). 3. The first, inaccurate, unshapen beginning or original of any thing (*Philips*).

RUDIME'NTAL. *a.* (from *rudiment*.) Initial; relating to first principles (*Spectator*).

RUDOLFWERD, a strong town of Germany, in Carniola, with an abbey. It is seated on the Gurck, in a country fertile in good wine, 45 miles S.E. of Laubach. Lon. 15. 20 E. Lat. 46. 8 N.

RUDOLPHIA, in botany, a genus of the class diadelphia, order decandria. Calyx two-lipped; corol with a long lanceolate banner; legume flat, many-seeded. Two species; twining shrubs of St. Domingo.

RUE (Goats). See GALIGA.

RUE (Common). See RUTA.

RUE (Meadow). See THALYCTRUM.

To RUE. *v. a.* (ꝛeoꝛꝛian, Saxon.) To grieve for; to regret; to lament (*Donne*).

RUE'FUL. *a.* (*rue* and *full*.) Mournful; woful; sorrowful (*Dryden*).

Ruellia Formosa.
Splendid Ruellia.



Smilacina Umbellata.
Umbelled Smilacina.

London, Published by Sherwood & Co. Paternoster Row, Feb.y 1.st 1812.

RUE'FULLY. *ad.* (from *rueful.*) Mournfully; sorrowfully (*More*).

RUE'FULNESS. *s.* (from *rueful.*) Sorrowfulness; mournfulness.

RU'ELLE. *s.* (French.) A circle; an assembly at a private house: not used (*Dryden*).

RUELLIA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol somewhat campanulate; stamens approaching each other in pairs; capsule bursting by elastic teeth. Forty-six species; shrubs of Asia, Africa, or America. See Nat. Hist. Pl. CXLII.

RUFF. *s.* (See RUFFLE.) 1. A puckered linen ornament, formerly worn about the neck (*Dryden*). 2. Any thing collected into puckers or corrugations (*Pope*). 3. A state of roughness: obsolete (*Chapman*). 4. New state: not used (*L'Estrange*).

RUFF, in ichthyology. See PERCA.

RUFF and REEVE, in ornithology. See TRINGA.

RUFFAC, a town of France, in the department of Upper Rhine, seated on the Rotbach, seven miles S. of Colmar, and 17 N.W. of Basle. Lon. 7. 27 E. Lat. 47. 58 N.

RUFFEC, a town of France, in the department of Charente, seated on the Anche, 24 miles N of Angoulême.

RU'FFIAN. *s.* (*ruffiano*, Italian.) A brutal, boisterous, mischievous fellow; a cutthroat; a robber; a murderer (*Hayward*).

RU'FFIAN. *a.* Brutal; savagely boisterous (*Pope*).

To RU'FFIAN. *v. n.* (from the noun.) To rage; to raise tumults; to play the ruffian: not in use (*Shakspeare*).

To RU'FFLE. *v. a.* (*ruyffelen*, Dutch, to wrinkle.) 1. To disorder; to put out of form; to make less smooth (*Boyle*). 2. To discompose; to disturb; to put out of temper (*Granville*). 3. To put out of order; to surprise (*Hudibras*). 4. To throw disorderly together (*Chapman*). 5. To contract into plaits (*Addison*).

To RU'FFLE. *v. n.* 1. To grow rough or turbulent (*Shakspeare*). 2. To be in loose motion; to flutter (*Dryden*). 3. To be rough; to jar; to be in contention: out of use (*Shaks.*).

RU'FFLE. *s.* (from the verb.) 1. Plaited linen used as an ornament (*Addison*). 2. Disturbance; contention; tumult (*Watts*).

RU'FFLERHOOD. *s.* In falconry, a hood to be worn by a hawk when she is first drawn (*Bailey*).

RUG. *s.* (*rugget*, rough, Swedish.) 1. A coarse nappy woollen cloth (*Peacham*). 2. A coarse nappy coverlet, used for mean beds (*Swift*). 3. A rough woolly dog: not used (*Shakspeare*).

RUGBY, a town in Warwickshire, with a market on Saturday, and a famous free-school. It is 11 miles S.E. of Coventry, and 85 N.N.W. of London. Lon. 1. 12 W. Lat. 52. 24 N.

RUGEN, an island of the Baltic, on the coast of Swedish Pomerania, opposite Stralsund, 23 miles long and 15 broad. It is strong both by art and nature, and abounds in corn and cattle. The chief town is Bergen.

RUGENWALD, a town of Prussian Pomerania, the chief place of the duchy of Wenden, with a castle, seated on the Wipper, eight miles from the Baltic, and 35 N.E. of Colberg. Lon. 16. 27 E, lat. 54. 35 N.

RU'GGED. *a.* (*rugget*, Swedish.) 1. Rough; full of unevenness and asperity (*Bentley*). 2. Not neat; not regular; uneven (*Shakspeare*). 3. Savage of temper; brutal; rough (*South*). 4. Stormy; rude; tumultuous; turbulent; tempestuous (*Shakspeare*). 5. Rough or harsh to the ear (*Dryden*). 6. Sour; surly; discomposed (*Shakspeare*). 7. Violent; rude; boisterous (*Hudibras*). 8. Rough; shaggy (*Fairfax*).

RUGGED, or SCABROUS, in botany. Scaber. Rough with tubercles, or prominent stiffish points. Applied to the leaf and stem: also to the calyx of the oak.

RU'GGEDLY. *ad.* (from *rugged.*) In a rugged manner.

RU'GGEDNESS. *s.* (from *rugged.*) 1. The state or quality of being rugged. 2. Roughness; asperity (*Ray*).

RU'GIN. *s.* A nappy cloth (*Wiseman*).

RU'GINE. *s.* (*rugine*, Fr.) A chirurgeon's rasp (*Sharp*).

RUGLEY, a town in Staffordshire, with a market on Tuesday, seated on the Trent, 10 miles S.E. of Stafford, and 126 N.W. of London. Lon. 1. 48 W. Lat. 52. 57 N.

RU'GOSE, or RU'GOUS. *a.* (*rugosus*, Lat.) Full of wrinkles.

RUHNKENIUS (David), of Stolp in Pomerania, became professor of belles lettres and history, and librarian in Leyden university. He died in 1798, aged seventy-five. He wrote Epistolæ criticæ in Hesiodi et Homeri hymnos —de vitâ et Scriptis Longini—Timæi sophistæ lexicon—Historia critica Oratorum Græcorum, 2 vols. 8vo.—editions of V. Paterculus, Rutilius Lupus, &c. His life has been published by Wyttenbach, and pretty copious memoirs are inserted in the Monthly Magazine for 1804, pp. 148—154.

RU'IN. *s.* (*ruine*, French; *ruina*, Latin.) 1. The fall or destruction of cities or edifices (*Beaumont*). 2. The remains of a building demolished (*Swift*). 3. Destruction; loss of happiness or fortune; overthrow (*Dryden*). 4. Mischief; bane (*Milton*).

To RU'IN. *v. a.* (*ruiner*, French.) 1. To subvert; to demolish (*Dryden*). 2. To destroy; to deprive of felicity or fortune (*Wake.*). 3. To empoverish (*Addison*).

To RU'IN. *v. n.* 1. To fall in ruins (*Milt.*). 2. To run to ruin; to dilapidate (*Sandys*). 3. To be brought to poverty or misery (*Locke*).

To RU'INATE. *v. a.* (from *ruin.*) Obsolete. 1. To subvert; to demolish (*Shaks.*). 2. To bring to meanness or misery irrecoverable (*Bacon*).

RUINATION. *s.* (from *ruinate.*) Subversion; demolition: obsolete (*Camden*).

RU'INER. *s.* (from *ruin.*) One that ruins (*Chapman*).

RU'INOUS. *a.* (*ruinosus*, Lat. *ruineaux*, Fr.) 1. Fallen to ruin; dilapidated; demolished (*Hayward*). 2. Mischievous; pernicious; baneful; destructive (*Swift*).

RU'INOUSLY. *ad.* 1. In a ruinous manner. 2. Mischievously; destructively (*Decay of Piety*).

RUIZIA, in botany, a genus of the class monadelphia, order polyandria. Calyx double, the outermost three-leaved; styles ten; capsules ten, one-celled, two-seeded, closely cohering. Three species; natives of the isle of Bourbon. In all the species the leaves are downy underneath, and the flowers in axillary, peduncled, bifid corymbs.

RULE. *s.* (*regula*, Latin.) 1. Government; empire; sway; supreme command (*Philips*). 2. An instrument by which lines are drawn (*South*). 3. Canon; precept by which the thoughts or actions are directed (*Tillotson*). 4. Regularity; propriety of behaviour: not in use (*Shakspeare*).

To RULE. *v. a.* (from the noun.) 1. To govern; to control; to manage with power and authority (*Dryden*). 2. To manage; to conduct (*Mac.*). 3. To settle as by a rule (*Atterbury*).

To RULE. *v. n.* To have power or command (*Locke*).

RULE, in a monastic sense, a system of laws or regulations, whereby religious houses are governed, and which the religious make a vow at their entrance to observe. Such are the rules of the Augustins, Benedictins, Carthusians, Franciscans, &c. See AUGUSTINS, &c.

RULES OF COURT, in law, are certain orders made from time to time in the courts of law, which attorneys are bound to observe, in order to avoid confusion; and both the plaintiff and defendant are at their peril also bound to pay obedience to rules made in court relating to the cause depending between them. It is to be observed, that no court will make a rule for any thing that may be done in the ordinary course; and that if a rule be made, grounded upon an affidavit, the other side may move the court against it, in order to vacate the same, and thereupon shall bring into court a copy of the affidavit and rule. On the breach and contempt of a rule of court an attachment lies; but it is not granted for disobedience to a rule, when the party has not been personally served: nor for disobeying a rule made by a judge in his chamber, which is not of force to ground a motion upon, unless the same be entered. A rule of court is granted every day the courts at Westminster sit, to prisoners of the King's-bench or Fleet prisons, to go at large about their private affairs.

RULE OF THREE. See ARITHMETIC and PROPORTION.

RULE, or RULER, an instrument of wood or metal, with several lines delineated on it, of great use in practical mensuration. When a ruler has the lines of chords, tangents, sines, &c. it is called a plane scale.

The carpenter's joint-rule is an instrument usually of box, &c. twenty-four inches long, and one and a half broad; each inch being subdivided into eight parts. On the same side with these divisions is usually added Gunter's line of numbers. On the other side are the lines of timber and board measure; the first beginning at 32, and continued to 36, near the other end; the latter is numbered from 7 to 36, 4 inches from the other end. We shall point out some of the uses of this rule

The application of the inches, in measuring lengths, breadths, &c. is obvious. That of the Gunter's line, see under the article GUNTER'S LINE.

The use of the other side is that with which we are now concerned. 1. The breadth of any surface, as board, glass, &c. being given, to find how much in length makes a square foot. Find the number of inches the surface is broad, in the line of board measure, and right against it is the number of inches required. Thus, if the surface were eight inches broad, eighteen inches will be found to make a superficial foot. Or more readily thus: apply the rule to the breadth of the board, or glass, that end, marked 36, being equal with the edge, the other edge of the surface will show the inches, and quarters of inches, which go to a square foot. 2. Use of the table at the end of the board-measure. If a surface be one inch broad, how many inches long will make a superficial foot? look in the upper row of figures for one inch, and under it in the second row is twelve inches, the answer to the question. 3. Use of the line of timber-measure. This resembles the former; for having learned how much the piece is square, look for that number on the line of the timber-measure; the space thence to the end of the rule is the length which, at that breadth, makes a foot of timber. Thus, if the piece be nine inches square, the length necessary to make a solid foot of timber is $21\frac{1}{3}$ inches. If the timber be small, and under nine inches square, seek the square in the upper rank of the table, and immediately under it is the feet and inches that make a solid foot. If the piece be not exactly square, but broader at one end than the other, the method is to add the two together, and take half the sum for the side of the square. For round timber the method is to girt it round with a string, and to allow the fourth part for the side of the square; but this method is erroneous, for hereby you lose nearly one fifth of the true solidity; though this is the method at present practised in buying and selling timber.

RULE (Coggeshall's sliding), is chiefly used for measuring the superficies and solidity of timber, &c. It consists of two rulers, each a foot long, one of which slides in a groove made along the middle of the other.

On the sliding side of the rule are four lines of numbers, three whereof are double; that is, are lines to two radiuses; and one, a single broken line of numbers: the three first, marked A, B, C, are figured 1, 2, 3, &c. to 9; then

1, 2, 3, &c. to 10. The single line, called the girt-line, and marked D, whose radius is equal to the two radiuses of any of the other lines, is broke for the easier measurement of timber, and figured 4, 5, 6, 7, 8, 9, 10, 20, 30, &c. From 4 to 5 it is divided into ten parts, and each tenth subdivided into 2, and so on, from 5 to 6, &c. On the backside of the rule are, 1. A line of inch-measure, from 1 to 12; each inch being divided and subdivided. 2. A line of foot measure, consisting of one foot, divided into 100 equal parts, and figured 10, 20, 30, &c. The back part of the sliding piece is divided into inches, halves, &c. and figured from 12 to 24; so that when drawn wholly out, there may be a measure of two feet.

There is a great variety of sliding-rules of other constructions, and serving to perform computations in arithmetic, trigonometry, mensuration, gauging, &c., but which it is not necessary to describe minutely here.

RULE (Gilbert), M. D. born at Elgin, in 1628. He took his degrees in King's college, Aberdeen, where he was appointed professor of philosophy. In 1661 he was ejected from his college for refusing to comply with the act of uniformity. He went to Leyden to study physic, which, on his return home, he practised until the revolution, when the magistrates of Edinburgh appointed him principal of their University. He died at Edinburgh in 1705.

RULED-PAPER. Paper on which the staves are ruled for receiving the written notes of any musical composition. Formerly this paper was wholly ruled by hand by common quill pens, the tedious operation of which was afterwards superseded by the invention of five-pointed pens, made of brass. At present, however, the still more expeditious method of ruling the paper with a machine is generally adopted.

RU'LER. *s.* (from *rule.*) 1. Governour; one that has the supreme command (*Raleigh*). 2. An instrument, by the direction of which lines are drawn (*Moxon*).

RUM, a name given by the native Americans, to a peculiar spirit distilled from melasses, and which has hence become current in our own language, as well as many others of Europe.

As we shall treat of this material in connection with various others of a similar kind, as brandy, geneva, and other corn-spirits, alkohol, &c. under the article SPIRITS, DISTILLED, we shall here only observe that rum is prepared by the distillation of a fermented liquor made from melasses and other coarse saccharine matter, procured during the manufacture of raw sugars in the West Indies. The common Jamaica process is as follows. The usual materials for the fermentation are molasses or melasses; in other words the treacle which drains from the sugar, scummings of the hot-cane juice, and sometimes raw cane-liquor, lees, or *dunder*, as it is called, and water. The dunder answers the purpose of yeast, and is usually prepared by a separate fermentation of cane-sweets and water. The materials being mixed in due proportion (which are about equal parts of scummings, dunder and water), the fermentation begins very soon, and in twenty-four hours the liquor is fit for the first charge of melasses, which is added in the proportion of three gallons for every hundred gallons of the liquor. Another charge is added a day or two afterwards. The heat in fermentation should not exceed 90° or 94°, so that in the West Indies it is necessary to keep the fermenting tubs as cool as possible. The fermentation falls in six or eight days, when the liquor grows fine and fit for distillation. In about two hours after lighting the fire the spirit begins to run, (in a still of 1200 gallons) and it is collected as long as it remains inflammable.

The first spirit is called in the country *low wines*, and it is rectified in a smaller still to the Jamaica proof, which is that in which oil olive will sink. About 220 gallons of proof rum are obtained from 530 gallons of low wines. See SPIRITS, DISTILLED, WINE, FERMENTATION, and RECTIFICATION.

To RU'MBLE. *v. n.* (*rommelen*, Dutch.) To make a hoarse, low, continued noise (*Roscommon*).

RU'MBLER. *s.* (from *rumble.*) The person or thing that rumbles.

RUMEN, the paunch or first stomach of such animals as chew the cud; thence called *ruminant* animals.

RUMEX. Dock. In botany, a genus of the class hexandria, order trigynia. Calyx three-leaved; petals three, connivent; seed one, superior, three-sided, naked; stigma many-cleft. Thirty-seven species, scattered over the globe; ten, common to the meadows, marshes, mountains, and woods, of our own country. The following are cultivated.

1. R. acetosa. Common sorrel. Well known; the whole herb acid, and pleasantly astringent: yielding a juice which of late years has been crystallized, and affords an admirable substitute for the juice of lemons. There is a variety with broad leaves, named great mountain sorrel.

2. R. sentatus. French sorrel. Stem from a foot to eighteen inches high; flowers hermaphrodite; leaves heart-halbert shaped, glaucous, fleshy. Germany.

3. R. acetosella. Sheep's sorrel. Flowers diœcous; valves without grains; leaves lanceolate, arrow-shaped. Found in our own pastures.

4. R. patientia. Patience dock, or rhubarb. Root large; bark brown; leaves ovate-lanceolate; flowers hermaphrodite. Italy.

5. R. sanguineus. Bloody-veined dock, or blood-wort. Flowers hermaphrodite; valves very entire, one of them bearing grain; leaves heart-lanceolate. There is a variety with green veins. A native of our own woods.

6. R. lunaria. Tree sorrel. Stalk woody, ten or twelve feet high; flowers hermaphrodite; valves toothed, naked; pedicels flat, reflected, thickened; flowers in threes. A native of Italy.

RUMFORD, a town in Essex, with a market for hogs on Tuesday, and for corn on Wednesday, 12 miles E.N.E. of London. Lon. 0. 13 E. Lat. 51. 36 N.

RUMILLY, a town of Savoy, seated on an elevated plain, at the confluence of the Seram and Nepha, five miles from Annecy. Lon. 6. 10 E. Lat. 45. 56 N.

RU'MINANT. *a.* (*ruminans*, Lat.) Having the property of chewing the cud (*Ray*).

To RU'MINATE. *v. n.* (*rumino*, Latin.) 1. To chew the cud (*Arbuthnot*). 2. To muse; to think again and again (*Fairfax*).

To RU'MINATE. *v. a.* 1. To chew over again. 2. To muse on; to meditate over and over again (*Shakspeare*).

RUMINA'TION. *s.* (*ruminatio*, Latin.) 1. The property or act of chewing the cud (*Arbuthnot*). 2. Meditation; reflection (*Thomson*).

To RU'MMAGE. *v. a.* (*ranmen*, German; *rimari*, Latin.) To search; to plunder; to evacuate (*Dryden*).

To RU'MMAGE. *v. n.* To search places (*Swift*).

RU'MMER. *s.* (*roemer*, Dutch.) A glass; a drinking cup (*Philips*).

RUMNEY, or RHYNEY, a river which rises in Brecknockshire, and separating the counties of Glamorgan and Monmouth, enters the Bristol channel to the S.E. of Cardiff.

RU'MOUR. *s.* (*rumeur*, French; *rumor*, Latin.) Flying or popular report; bruit; fame (*Dryden*).

To RU'MOUR. *v. a.* (from the noun.) To report abroad; to bruit (*Dryden*).

RU'MOURER. *s.* (from *rumour*.) Reporter; spreader of news (*Shakspeare*).

RUMP. *s.* (*rumpff*, German.) 1. The end of the back bone (*Swift*). 2. The buttocks (*Shakspeare*).

RUMPHIA, in botany, a genus of the class triandria, order monogynia. Calyx three-cleft; petals three; drupe three-celled. One species; an Indian tree, with cinereous bark, and axillary racemes.

To RU'MPLE. *v. a.* (*rompelen*, Dutch.) To crush or contract into equalities and corrugations; to crush together out of shape (*Black.*).

RU'MPLE. *s.* (hpeỳmpelle, Sax.) Pucker; rude plait (*Dryden*).

RUMSEY, a corporate town in Hampshire, with a market on Saturday. It is governed by a mayor, has a manufacture of shaloons, and several paper and corn mills. It is eight miles N.N.W. of Southampton, and 74 W. by S. of London. Lon. 1. 31 W. Lat. 51. 2 N.

To RUN. *v. n.* pret. *ran.* (ỳnnan, Saxon; *rennen*, Dutch.) 1. To move swiftly; to ply the legs in such a manner as that both feet are at every step off the ground at the same time; to make haste; to pass with very quick pace (*Swift*). 2. To use the legs in motion (*Locke*). 3. To move in a hurry (*Ben Jonson*). 4. To pass on the surface, not through the air (*Exodus*). 5. To rush violently (*Burnet*). 6. To take a course at sea (*Acts*). 7. To contend in a race (*Swift*). 8. To flee; not to stand (*Bacon*). 9. To go away by stealth (*Shakspeare*). 10. To emit or let flow any liquid (*Shakspeare*). 11. To stream; to flow, to have a current; not to stagnate (*Addison*). 12. To be liquid; to be fluid (*Bacon*). 13. To be fusible; to melt (*Dryden*). 14. To fuse; to melt (*Moxon*). 15. To pass; to proceed (*Locke*). 16. To flow as periods or metre; to have a cadence: as, *the lines* run *smoothly*. 17. To go away; to vanish (*Addison*). 18. To have a legal course; to be practised (*Child*). 19. To have a course in any direction (*Addison*). 20. To pass in thought or speech (*Felton*). 21. To be mentioned cursorily, or in few words (*Arbuthnot*). 22. To have a continual tenour of any kind (*Sanderson*). 23. To be busied upon (*Swift*). 24. To be popularly known (*Temple*). 25. To have reception, success, or continuance: as *seditious papers always* run. 26. To go on by succession of parts (*Pope*). 27. To proceed in a train of conduct (*Shakspeare*). 28. To pass into some change (*Tillotson*). 29. To proceed in a certain order (*Dryden*). 30. To be in force (*Bacon*). 31. To be generally received (*Knolles*). 32. To be carried on in any manner (*Ayliffe*). 33. To have a track or course (*Boyle*). 34. To pass irregularly (*Cheyne*). 35. To make a gradual progress (*Pope*). 36. To be predominant (*Woodward*). 37. To tend in growth (*Bacon*). 38. To grow exuberantly (*Mortimer*). 39. To excern puss or matter (*Leviticus*). 40. To become irregular; to change to something wild (*Granville*). 41. To go by artifice or fraud (*Hudibras*). 42. To fall by haste, passion, or folly, into fault or misfortune (*Knolles*). 43. To fall; to make transition (*Watts*). 44. To have a general tendency (*Swift*). 45. To proceed as on a ground or principle (*Atterbury*). 46. To go on with violence (*Swift*). 47. *To* RUN *after*. To search for; to endeavour at, though out of the way (*Locke*). 48. *To* RUN *away with*. To hurry without deliberation (*Locke*). 49. *To* RUN *in with*. To close; to comply (*Baker*). 50. *To* RUN *on*. To be continued (*Hooker*). 51. *To* RUN *on*. To continue the same course (*Drayton*). 52. *To* RUN *over*. To be so full as to overflow (*Dryden*). 53. *To* RUN *over*. To be so much as to overflow (*Dryden*). 54. *To* RUN *over*. To recount cursorily (*Ray*). 55. *To* RUN *over*. To consider cursorily (*Wotton*). 56. *To* RUN *out*. To be at an end (*Swift*). 57. *To* RUN *out*. To spread exuberantly (*Taylor*). 58. *To* RUN *out*. To expatiate (*Broome*). 59. *To* RUN *out*. To be wasted or exhausted (*Ben Jonson*). 60. *To* RUN *out*. To grow poor by expence disproportionate to income (*Swift*).

To RUN. *v. a.* 1. To pierce; to stab (*Shakspeare*). 2. To force; to drive (*Locke*). 3. To force into any way or form (*Felton*). 4. To drive with violence (*Knolles*). 5. To melt; to fuse (*Felton*). 6. To incur; to fall into (*Calamy*). 7. To venture; to hazard (*Clarendon*). 8. To import or export without duty (*Swift*). 9. To prosecute in thought (*Collier*). 10. To push (*Addison*). 11. *To* RUN *down*. To chase to weariness (*L'Estrange*). 12. *To* RUN *down*. To crush; to overbear (*South*).

RUN. *s.* (from the verb.) 1. Act of running (*L'Estrange*). 2. Course; motion (*Bacon*). 3. Flow; cadence (*Broome*). 4. Course; process. 5. Way; will; uncontrolled course (*Arbuthnot*). 6. Long reception; continued success (*Addison*). 7. Modish clamour (*Swift*). 8. *At the long* RUN. In fine; in conclusion; at the end (*Wiseman*).

RU'NAGATE. *s.* (*renegat*, French.) A fugitive; rebel; apostate (*Raleigh*).

RU'NAWAY. *s.* (*run* and *away*.) One that flies from danger; one who departs by stealth; a fugitive (*Shakspeare*).

RUNCINATE LEAF, in botany. (*Runcina*, a large saw.) Pinnatifidum, ita ut lobi antice convexi, postice sint transversi. A sort of pinnatifid leaf, with the lobes convex before and straight behind, like the teeth of the large double saw used in sawing timber. Exemplified in common dandelion. This term does not occur in Philosophia Botanica, and was not originally distinguished by Linnéus from his pinnatifid leaf, of which it is only a variety.—Runcina seems rather to be a plane.

RU'NDLE. *s.* (of *round*.) 1. A round; a step of a ladder (*Duppa*). 2. A peritrochium; something put round an axis (*Wilkins*).

RU'NDLET. *s.* A small barrel (*Bacon*).

RUNG. The pret. and part. pass. of *ring*.

RUNGS, in a ship, the same with the floor or ground timbers, being the timbers which constitute her floor, and are bolted to the keel, whose ends are rung-heads.

RUNG-HEADS, in a ship, are made a little bending, to direct the sweep or mould of the futtocks, and naval timbers; for here the lines, which make the compass and bearing of a ship, do begin.

RUNIC, a term applied to the language and letters of the ancient Goths, Danes, and other northern nations.

The word *rune*, according to Mallet, is derived from a word in the ancient Gothic language, signifying to cut: but Wormius, with greater probability, derives *rune* from either *ryn*, a furrow, or *ren*, a gutter or channel. As these characters were first cut in wood or stone, the resemblance to a furrow, or channel, would easily suggest the appellation.

Some have been of opinion, that Gulphilas, or Ulphilas, a Gothic bishop, about the year 370, was the first inventor of the Runic character: but Olaus Wormius shews at large, that Ulphilas could only be the first who taught it to foreigners; for that the runæ, or characters themselves, were older than he.

In reality, Ulphilas, according to other authors, was so far even from teaching the character, that he invented an alphabet of his own, on purpose to put the Runic characters, which had been made subservient to the superstitions of heathenism, out of use.

Many learned writers have adopted the opinion, first suggested by Dr. Hickes, that the Runic character was borrowed from the Roman: and they farther maintain, that it was not known in the north before the introduction of Christianity. If it were allowed, that the Runic characters are borrowed from the Roman alphabet, it by no means follows that the Scandinavians had waited for the secret till the introduction of Christianity among them: but it is justly observed, by Wormius, that they are as easily reducible to the Greek and Hebrew alphabets as to the Roman. An evident proof that the Runic were not derived from the Roman letters, results, not only from their form, which has scarce any resemblance to these, but from their number (being but 16), and their order and names, which have nothing in common with the Roman, Greek, or Gothic characters of Ulphilas. A comparative view of the Runic and Gothic, in these respects, may be seen in the English translation of Mallet's Northern Antiquities, vol. i. p. 370. M. Mallet has sufficiently shewn, that all the old chronicles and poems of the North universally agree in assigning to the Runic characters a very remote antiquity, and in attributing the invention of them to Odin himself, whom their poets expressly call the inventor of the Runes.

RUNIC STAFFS were a kind of calendars or compendious almanacs, used in the North, marked out by lines upon short pieces of board, or smooth sticks, some of which bear the appearance of great antiquity. They were called, in the North, rim-stocks and prim-staffs; and exhibited, by different lines or marks, the fasts and festivals, the golden number, dominical letter, epact, &c. Dr. Plot in his History of Staffordshire, p. 418, &c. describes one of these instruments under the name of a clog, and illustrates the construction of it by a figure.—He observes, that this kind of almanac is a remain of the Danish government, and that it was still in use amongst the meaner sort of people. Those which he met with in Staffordshire had only the prime and the immoveable feasts upon them; whereas others of a more perfect kind, preserved in the cabinets of the curious, have likewise the dominical letters. And of those imperfect ones there were two kinds: some public, of a larger size, which were commonly hung at one end of the mantle-tree of the chimney, for the use of the whole family, as Wormius informs us they disposed of them in Denmark; and others private, of a smaller size, which they carried in their pockets. This chronological instrument is sometimes, by an evident corruption, called runstock.

RU'NNEL. *s.* (from *run*.) A rivulet; a small brook (*Fairfax*).

RU'NNER. *s.* (from *run*.) 1. One that runs. 2. A racer (*Dryden*). 3. A messenger (*Swift*). 4. One of the stones of a mill (*Mort.*).

RUNNER, in the sea language, a rope belonging to the garnet, and to the two bolt tackles. It is reeved in a single block, joined to the end of a pennant, and has at one end a hook to hitch into any thing, and at the other end a double block, into which is reeved the fall of the tackle, or the garnet, by which means it purchases more than the tackle would without it.

RUNNER, in botany. Reptans flagellum. A shoot producing roots and leaves at the end only, and thus propagating the plant: as in strawberry. See SARMENTOSE.

RUNNET. See RENNET.

RUNNING THRUSH. See THRUSH.

RU'NNING. *a.* Kept for the race (*Law*).

RU'NNION. *s.* (*rognant*, French, scrubbing.) A paltry scurvy wretch (*Shakspeare*).

RUNT. *s.* (*runte*, in the Teutonic dialects, signifies a bull or cow.) Any animal small below the natural growth of the kind (*Cleaveland*).

RUPALA, in botany, a genus of the class tetrandria, order monogynia. Calyxless, petals four, cohering at the base; stamens inserted on the middle of the petals; pericarp one-celled, one-seeded. Two species; natives of Cayenne.

RUPEE, ROUPIA, or ROUPIAS, a coin very current in the territories of the Great Mogul, and in several other parts of the East Indies. See COIN.

Rupees are struck both of gold and silver, and both the one and the other have their diminutions, as half-rupees, quarter-rupees, &c.

The gold rupee is worth 1s. 6d. sterling. The silver rupee is struck in the Mogul's mints, with an inscription of his name and titles, the year of his reign, and the place it was struck at. It weighs from 7dwt. 10½gr. to 7dwt. 11gr. and has from 1 to 2 parts in 100 allay. 100,000 is one lack, 100 lacks are one crore, and 100 crores are one anib.

The value of the silver rupee is various, according to its quality, and the place where it is coined.

RUPERT, a river of New Britain, which issues from the lake Mistassin, and flows W. into the S.E. part of James bay. In its course it forms several small lakes; and at its mouth is the remain of Fort Rupert, formerly a settlement of the Hudson Bay company. Lon. 76. 58 W. Lat. 51. 3 N.

RUPERT'S DROPS, an elegant glass toy, simply formed by pouring a small solid lump of green bottle glass, when red-hot, into water, by which means the rounded lump assumes gradually a lengthened form, terminating with a fine and nearly capillary tail, at the extremity. This solid lump will bear very considerable violence on the massy end without injury, and is altogether extremely tough; but whenever the smallest portion of the thinner end is broken off, the whole bursts with a smart snap, and instantly crumbles into innumerable fragments as small as fine sand; which, from their very minuteness, and the imperfection of their crystallization, do no other injury to the hand that holds the drop, than that of producing a slight sting from the sudden concussion.

This curious and extraordinary fragility is obviously owing to some permanent and very strong inequality of pressure; for when the Rupert's drops are heated so red as to be soft, and are let to cool gradually of themselves, and, consequently, to become better annealed, this property of bursting is entirely lost, and, at the same time, the specific gravity of the drop is increased.

These drops are also called, on the continent, *Larmes Bataviques*, or *Batavian Tears*.

All glass, not regularly annealed, or, in other words, cooled suddenly instead of progressively, has a tendency towards the same frangibility. Thus, in common window glass, if it be properly annealed, the diamond cuts it with moderate ease, making an uniform smooth furrow, at first dark, but gradually opening, and appearing like a bright silver thread: but when the glass is badly annealed, the diamond works with much more difficulty, the cut opens very slowly, and often flies into a different direction, or the glass entirely breaks.

There is another equally curious glass toy, formed upon the same principle, and evincing the same effect, called the *Bologna phial*. This is simply a phial, of any shape whatever, made of any kind of glass, but much thicker at the bottom than at top, and cooled immediately, without annealing. These being pretty stout, from their thickness will bear a smart blow from a wooden mallet, or any blunt instrument, or the concussion of a leaden bullet dropped into it from a considerable height, without injury: but if any sharp body, however small, such as a large grain of sand, or, which is still better, the shiver of a gun-flint, be dropped in from only a few inches height, the bottom cracks all around, just above the thickest part, and drops off. The same effect takes place if the bottom be slightly scratched with any hard body. When very brittle, if a hard angular substance, as a cut diamond, be dropt in, it will sometimes pass through the bottom, though very thick, with apparently as little resistance as through a spider's web. These glasses, when they have received the first injury, do not always crack immediately, but remain whole, sometimes for a few minutes, sometimes for hours, and then suddenly give way.

RUPPIA, in botany, a genus of the class tetrandria, order tetragynia. Calyxless; corolless; seeds four, pedicelled. One species only, found wild in our salt water ditches.

RUPPIN, a town of Brandenburg, in the Middle mark, capital of a circle of the same name, which was formerly a county. It stands on the W. side of a lake, formed by the river Rhin; and on the opposite side of the lake is Old Ruppin, with an ancient castle, the residence of its former counts, whose burial-place is at New Ruppin. This town was entirely consumed by fire, in 1787, but is rebuilt in a handsome manner, and greatly augmented. It has a considerable trade, a manufacture of cloth, and noted breweries. It is 32 miles N.N.W. of Berlin. Lon. 13. 0 E. Lat. 52. 56 N.

RU'PTION. *s.* (*ruptus*, Latin.) Breach; solution of continuity (*Wiseman*).

RU'PTURE. *s.* (*rupture*, French; from *ruptus*, Latin.) 1. The act of breaking; state of being broken; solution of continuity (*Arbuthnot*). 2. A breach of peace; open hostility.

RUPTURE. See HERNIA.

To RU'PTURE. *v. a.* (from the noun.) To break; to burst; to suffer disruption (*Sharp*).

RU'PTUREWORT. *s.* (*herniaria.*) A plant.

RU'RAL. *a.* (*rural*, French; *ruralis*, Latin.) Country; existing in the country, not in cities; suiting the country; resembling the country (*Thomson*).

RURA'LITY. RU'RALNESS. *s.* (from *rural.*) The quality of being rural.

RUREMONDE, or ROERMONDE, a strong town of France, in the department of Roer, lately of Austrian Gelderland, and a bishop's see. It has been taken several times; particularly in 1792, by the French, who were obliged to evacuate it soon after, but took it again the next year. It is seated at the conflux of the Roer with the Meuse, 12 miles S. of Velno, and 28 N.N.E. of Maestricht. Lon. 6. 4 E. Lat. 51. 11 N.

RURI'COLIST. *s.* (*ruricola*, Latin.) An inhabitant of the country.

RURI'GENOUS. *a.* (*ruro* and *gigno*, Lat.) Born in the country.

RUSCUS. Butcher's broom; Knee-holly. In botany, a genus of the class dioecia, order triandria. Calyx six-leaved; corolless. Male: nectary ovate; tubular, bearing the stamens within. Female: stamenless; style one; berry superior, three-celled; seeds in pairs. Five species, as follow:

1. R. aculeatus. Prickly butcher's broom. Stem suffruticose, tough, stiff, from eighteen inches to three feet high; leaves with pungent points, bearing the flowers above, naked: flowers small, yellowish green or purplish. Female flower succeeded by berries, red, larger than those of the asparagus, and almost as large as some cherries, of a sweetish taste, with two large orange-coloured seeds in each.

The seeds of this plant generally lie a year in the ground before they vegetate, and the plants so raised are long before they attain size enough to make any figure; whence it is much better to transplant the roots. Groves of England.

2. R. hypophyllum. Broad-leaved butcher's broom. Leaves broader than in the last, bearing the flowers underneath, naked. Italy.

3. R. hypoglossum. Double-leaved butcher's broom. Leaves floriferous underneath, beneath the leaflet: flowers of a pale yellow; berries like those of the first sort. Italy.

4. R. racemosus. Alexandrian laurel. Stalks slender, about four feet high, sending out side-branches; racemes terminal, hermaphrodite; flowers of an herbaceous yellow colour; berries like R. aculeatus. Portugal.

5. R. androgynus. Climbing butcher's broom. Stalks pliant, seven or eight feet high; leaves bearing the flowers at the edge; flowers white; berries yellowish red. Canaries.

All these are cultivated in our gardens, and appear ornamental on the verges of shrubberies, as being evergreens. They are easily propagable by seeds or suckers. The last is the tenderest of the tribe, and will rarely flourish without the aid of a green-house.

RUSE. *s.* (French.) Cunning; artifice; little stratagem; trick (*Ray*).

RUSH. *s.* (ɹyꝛc, Saxon.) See JUNCUS.

RUSH (Flowering), in botany. See BUTOMUS.

RUSH (Sweet), in botany. See ACORUS.

RUSH CANDLE. Rushlight. See CANDLE.

To RUSH. *v. n.* (hꝛeoꝛan, Saxon.) To move with violence; to go on with tumultuous rapidity (*Sprat*).

RUSH. *s.* (from the verb.) Violent course (*Crashaw*).

RUSH-NUT. The root of the cyperus esculentus of Linnéus, a native of Italy, where it is collected and eaten, being more delicately and pleasantly tasted than our chesnuts. See CYPERUS.

RUSHWORTH (John), born in Northumberland, about 1607. He was a student of Oxford, and became a barrister of Lincoln's-inn. He took down, in short hand, the debates in parliament, and speeches from the king's mouth, or those delivered in the exchequer and star chambers, as well as at the council table. Sir Thomas Fairfax, his near relation, when appointed general of the parliament forces, made him his secretary. In 1658 he was chosen one of the burgesses for Berwick-upon-Tweed, to serve in the protector Richard's parliament; and was again chosen for the same place in 1660. He died in the king's-bench prison, in 1690. His historical collections of state papers are very valuable, though not always to be relied on.

RUSSEL (lord William), third son of William, first duke of Bedford, was born about 1641. His lordship soon obtained a seat in the house of commons, where he sided with the whig party, and set himself with great zeal against the duke of York's succession. He afterwards entered into various schemes for excluding that prince, and for which he was tried at the Old Bailey, by a venal court and a packed jury, who found him guilty, and he was beheaded in Lincoln's-inn-fields, July 31st, 1683: though in 1689 the house of lords passed an act to reverse his attainder. He married Rachel, second daughter of Wriothesly, earl of Southampton, widow of lord Vaughan, a woman of great talents and piety. When she heard of his condemnation, she threw herself at the king's feet, but Charles was inexorable, and she immediately went to the Tower, and employed all the powers of affection and eloquence in exhorting her husband to die with heroic resolution. She parted from him on the day of his execution, and he, turning from her, exclaimed, "the bitterness of death is now passed." She continued a widow till her death, 1723, at the age of 87. The letters which passed between her and her husband display, in the strongest features, the characters of a man of uprightness and integrity, and of a woman of the most generous heart, and the most affectionate sentiments.

RUSSELIA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-leaved; corol two-lipped, elongated; stigma globular; capsule pointed, one-celled, two-

valved, many-seeded. One species; a climbing shrub of Havannah, with red flowers.

RUSSELSHEIM, a town of Germany, in the principality of Hesse-Darmstadt, situate on the Maine, six miles E. of Mentz, and 13 N.W. of Darmstadt.

RU'SSET. *a.* (*rousset*, Fr. *russus*, Latin.) 1. Reddishly brown (*Dryden*). 2. *Newton* seems to use it for gray. 3. Coarse; homespun; rustic (*Shakspeare*).

RU'SSET. *s.* Country dress (*Dryden*).

RU'SSET. RU'SSETING. *s.* A name given to several sorts of pears or apples from their colour (*Mortimer*).

RUSSIA, a vast empire, partly in Asia, and partly in Europe; bounded on the N. by the Frozen ocean, E. by the Pacific ocean, S. by Great Tartary, the Caspian sea, Persia, Turkey in Asia, and the Black sea, and W. by Turkey in Europe, Poland, the Baltic sea, and Sweden. There were three countries that had the name of Russia; namely, Red Russia, which formed the S. part of Poland; White Russia, which comprehended the E. part of Lithuania; and Black Russia, which included the governments of Kaluga, Moscow, Tula, Rezan, Volodimir, and Yaroslaf; and hence his imperial majesty takes the title of emperor of all the Russias. This empire, exclusive of the late acquisitions from the Turks and from Poland (see POLAND) forms a square, whose sides are 2000 miles each. A country of such vast extent must lie in different climates; and the soil and products must be as different; but not one third of the country is sufficiently peopled, or properly cultivated.

The population of European Russia, was estimated in 1799 at 33 millions: since that period it has gradually increased, and is now about 36 millions.

In the middle and northern parts of the empire, the cold is very severe, and the days extremely short in winter; but the summers are warm and delightful; and even in the shortest nights the twilight is very luminous. At the winter solstice, when the day is at the shortest, the sun rises and sets on the horizon of some of the principal cities in the Russian empire according to the following table:

	H.	M.		H.	M.
At Astrachan sun rises	7	48	sun sets	4	12
Kiev - -	8	7		3	53
Moscow - -	8	37		3	23
Riga - -	8	47		3	13
Tobolsk - -	8	56		3	4
Petersburg -	9	15		2	45
Archangel -	10	24		1	36

At the summer solstice, when the day is at its greatest length, this order is reversed. The most fertile part is near the frontiers of Poland; insomuch that the inhabitants are able to supply their neighbours with corn: the N. part is not only more cold, but very marshy, and overrun with forests, inhabited chiefly by wild beasts. The whole country is well watered by lakes and numerous rivers, which abound with fish; the principal rivers are the Dnieper, Volga, Don, Dwina, and Oby. Medicinal and saline springs are not uncommon; and there are mines of fine silver, copper, iron, and other minerals. The red and black juchte, or Russia leather, for colour, smell, and softness, cannot be equalled in any other part of the world; and there are likewise flourishing manufactures of linen, woollen stuffs, velvet, and silk: also brass, iron, steel, and tin are wrought; and great guns, arms, wire, cordage, canvas, paper, parchment, candles, saltpetre, gunpowder, glass, &c. are made in Russia. This country affords a variety of commodities, which are of great use to foreigners, and as its exports greatly exceed the imports, there is a considerable annual balance of trade in its favour. The home commodities are sables, black furs, the skins of black and white foxes, ermines, hyenas, lynxes, bears, panthers, wolves, martins, white hares, &c. likewise Russia leather and linen, copper, iron, talc, tallow, wax, honey, corn, potash, tar, linseed and train-oil, castor, isinglass, hemp, flax, thread, Siberian musk, soap, feathers, timber, &c. To these commodities may be added almost all the merchandise of China, India, Persia, Turkey, and some European countries. This extensive empire was divided by Catharine II. into 41 governments; namely Petersburg, Olonetz, Wiburg, Revel, Riga, Pskof, Novogorod, Tver, Smolensk, Polotsk, Mohilef, Orel, Kaluga, Moscow, Tula, Rezan, Volodimir, Jaroslaul, Vologda, Archangel, Kostroma, Niznei Novogorod, Kasan, Simbirsk, Penza, Tambof, Voronetz, Kursk, Novogorod Severskoi, Tchernigof, Kiof, Kharkof, Catharinenslaf, Caucasia, Saratof, Viatka, Perm, Tobolsk, Ufa, Kolivan, and Irkutsh; all which see, and Siberia. The church is governed by a patriarch, under whom are the archbishops and bishops. The established religion is that of the Greek church, which was first embraced by the great duchess Olga, in the year 955, and afterward by her grandson, the great duke Wladimir, in 988, whose example was followed by his subjects. But a considerable number of Russians profess the Mahometan religion, and a greater number are still pagans. The inhabitants of the provinces conquered from Sweden are Lutherans; and the protestants, of whom there are great numbers among the Russians, as also the papists, enjoy full liberty of conscience, and the public exercise of their religion; but the latter are not suffered to hang up bells in their churches. There are many convents for both sexes in the empire; but Peter I. prudently ordered, that no man should enter on a monastic life before he is thirty years of age, and that no woman should take the veil under fifty, and then not without the licence of the holy synod. Formerly the Russians were wholly employed in agriculture, feeding of cattle, hunting, and fishing; and he was thought a learned man who could read and write: but Peter the great undertook to introduce the arts and sciences; and, in 1724, he founded the first university that ever was in Russia, and an academy of sciences, at Peters-

burg, supplied with some of the best professors in Europe; and he also invited and established great numbers of excellent artificers. The Russians, in general, are robust, well-shaped, and of pretty good complexion. They are great eaters, and very fond of brandy. They use bathing, but smoke no tobacco, lest the smoke should dishonour the images of the saints, which they hold in great veneration; however, they take a great deal of snuff, made of the tobacco brought from the Ukraine. With respect to dress, a long beard is in high estimation among the fair nymphs of Russia. The commonalty have still a great veneration for this fringe of human hair, notwithstanding the efforts of their monarchs to root it out; and it is only those depending upon government, in the army and navy, who have yet complied with the custom and the wish of the court. Those who retain their beards retain likewise the ancient dress, the long swaddling coat, either of skins, or of coarse cloth lined with skins, in winter; and in summer, of cloth only. About their middle they have a sash of any colour; but what they mostly affect, is green or yellow. They wear trowsers instead of breeches and stockings; their limbs are, besides, wrapped in many folds of woollen stuffs to keep them warm, and over all they wear boots. Their shirts are without collars; and their necks exposed to the cold, which are hard and impenetrable from this practice. Government continues to exert every nerve to compel the subjects to adopt the German dress. The clergy alone excepted, none can procure any place, or favour from court, upon other condition than banishing the Asiatic sheepskin robes. The worn-out veteran retires with a pension, upon the express terms of never again assuming the habit of his fathers. But so zealously attached are the multitude to former manners, and so honourably do they esteem them, that a Russian dressed in his beard and gown, tells you by his looks that he has not prostituted the memory of his ancestors. The dress of the women is the reverse of the men, both in fashion and colour; every part of it being as short and tight as decency will allow, and very gaudy. It is the same with that of the Highland women in Scotland; both have the short jacket, the striped petticoat, and the tartan plaid; and both too, in general, have a napkin rolled about their head. The Russian women are, however, far more elegant and rich in their attire; nor is gold lace and paint wanting, to set off their charms. The young generation are modernizing these antic vestments; the stiff embroidered napkin is supplanted by one of flowing silk; the jacket and petticoat are of muslin, or other fine stuffs; and the plaid is exchanged for a silk or satin cloak, in the cold season, lined with fur. The better class of females wear velvet boots. The dress of the higher ranks is after the French and English fashion; and all wear a covering of fur six months of the year. Persons of both sexes wear a cross on their breasts, which is put on when they are baptized, and never laid aside while they live: the peasants crosses are of lead, but those worn by the better sort are of gold or silver. The sovereign of Russia is absolute. He was formerly called grand duke, which is now the title of the heir apparent; he afterward assumed the title of czar, which the natives pronounce tzar, or zaar, a corruption of Cesar, emperor; from some fancied relation to the Roman emperors; on account of which they also bear the eagle as a symbol of their empire. The first who bore the title of czar was Basil, son of Basilides, who freed his country from its subjection to the Tartars, about the year 1470. The title of emperor was first assumed by Peter I. who, by his actions, justly acquired the surname of Great, and finished his glorious course in the year 1725. Perhaps no country ever exhibited, in so short a time, the wonders that may be effected by the genius and exertions of one man. Peter the great, at his accession to the throne, found his subjects of all ranks involved in the grossest ignorance and barbarism; his numerous armies ferocious and undisciplined; and he had neither merchant ships nor men of war; which, added to the remoteness of her situation, rendered the influence of Russia in the politics of Europe of little consideration. Peter civilized his barbarous subjects, disciplined his armies, built cities and fortresses, and created a navy. These national improvements have been continued since his time, and Russia now holds a rank among the nations of the world, of which human foresight, at the commencement of the eighteenth century, could have formed no conception. Petersburg is the capital of the whole empire.

For more important information respecting Russia, we beg to refer to Dr. Clarke's Travels in Russia, and to Mr. Myers's Geography, recently published.

RUSSIA ASHES. The impure potash, as imported from Russia.

RUSSIA COMPANY. See COMPANY.

RUST, the oxyd of a metal. Iron, for instance, when exposed to the air, soon becomes tarnished, and gradually changed into a brown or yellow powder, well known by the name of rust. This change is occasioned by the gradual combination of the iron with the oxygen of the atmosphere, and, according to the new chemistry, it is now denominated the oxyd of iron.

To RUST. *v. n.* (from the noun.) 1. To gather rust; to have the surface tarnished or corroded (*Dryden*). 2. To degenerate in idleness (*Dryden*).

To RUST. *v. a.* 1. To make rusty (*Shakspeare*). 2. To impair by time or inactivity.

RU'STIC. *a.* (*rusticus*, Lat. *rustique*, Fr.) 1. Rural; country (*Sidney*). 2. Rude; untaught; inelegant (*Watts*). 3. Brutal; savage (*Pope*). 4. Artless; honest; simple. 5. Plain; unadorned (*Milton*).

RU'STIC. *s.* A clown; a swain; an inhabitant of the country (*South*).

RUSTIC, in architecture, implies a manner of building in imitation of nature, rather than

according to the rules of art. See ARCHITECTURE.

RUSTIC GODS, *dii rustici*, in antiquity, were the gods of the country, or those who presided over agriculture, &c. Varro invokes the 12 *dii consentes*, as the principal among the rustic gods; viz. Jupiter, Tellus, the Sun, Moon, Ceres, Bacchus, Rubigus, Flora, Minerva, Venus, Lympha, and Good Luck. Besides these 12 arch rustic gods, there were an infinity of lesser ones; as Pales, Vertumnus, Tutelina, Fulgor, Sterculius, Mellona, Jugatinus, Collinus, Vallonia, Terminus, Sylvanus, and Priapus. Struvius adds the Satyrs, Fauns, Sileni, Nymphs, and even Tritons; and gives the empire over all the rustic gods to Pan.

RUSTIC ORDER, that decorated with rustic quoins, rustic work, &c.

RUSTIC WORK, is where the stones in the face, &c. of a building, instead of being smooth, are hatched, or picked with a point of a hammer.

RU'STICAL. *a.* (*rusticus*, Lat.) Rough; savage; boisterous; brutal; rude (*Brown*).

RU'STICALLY. *ad.* (from *rustical.*) Savagely; rudely; inelegantly (*Dryden*).

RU'STICALNESS. *s.* (from *rustical.*) The quality of being rustical; rudeness; savageness.

To RU'STICATE. *v. n.* (*rusticor*, Latin.) To reside in the country (*Pope*).

To RU'STICATE. *v. a.* To banish into the country (*Spectator*).

RUSTI'CITY. *s.* (*rusticité*, Fr. *rusticitas*, Latin.) 1. Qualities of one that lives in the country; simplicity; artlessness; rudeness; savageness (*Woodward*). 2. Rural appearance.

RU'STINESS. *s.* (from *rusty.*) The state of being rusty.

To RU'STLE. *v. n.* (hpirtlan, Sax.) To make a low continued rattle; to make a quick succession of small noises (*Shakspeare*).

RU'STY. *a.* (from *rust.*) 1. Covered with rust; infected with rust (*Dryden*). 2. Impaired by inactivity (*Shakspeare*).

To RUT. *v. n.* (*ruit*, Fr.) To desire to come together. Used of deer.

RUT. *s.* (*ruit*, French.) 1. Copulation of deer (*Bacon*). 2. The track of a cart wheel (*Chapman*).

RUTA. Rue. In botany, a genus of the class decandria, order monogynia. Calyx five-parted; petals concave; receptacle surrounded with ten melliferous dots; capsule lobed. In some species a fifth part of the fructification or number of dots is wanting. Seven species; natives of the south of Europe, and of Palestine. The following four are cultivated.

1. R. graveoleus. Common rue. Root woody, branched; stems frutescent, covered with a rugged gray striated bark, more than eighteen inches high; leaves more than decompound; leaflets oblong, with an obovate terminal one; petals entire. It has several varieties, as broad-leaved, narrow-leaved, variegated-leaved. Rue has a strong and grateful smell, and a bitter, hot, penetrating taste; the leaves are so acrid, that by much handling they have been known to irritate and inflame the skin; and the plant, in its natural or uncultivated state, is said to possess these sensible qualities still more powerfully. The imaginary quality of the rue, in resisting and expelling contagion, is now laid aside. It is doubtless a powerful stimulant, and is considered, like other medicines of the fetid kind, as possessing attenuating, deobstruent, antispasmodic powers. In the London pharmacopœia it is directed in the form of an extract; and it is also an ingredient in the pulvis e myrrha comp.

2. R. montana. Mountain rue. Leaves more than decompound; all the leaflets linear; petals entire.

3. R. chalepensis. African rue. Very like the first; petals ciliate-toothed.

4. R. patavina. Three-leaved rue. Stalk rises singly from the root, herbaceous, about a foot high; leaves ternate, sessile, linear; flowers yellow. A native of Padua.

They may be all propagated by seeds, slips, or cuttings.

RUTA MURARIA. The plant to which this name is given in the pharmacopœias, is the asplenium ruta muraria of Linnéus. It is supposed by some to possess specific virtues in the cure of ulcers of the lungs, and is exhibited in the form of decoction.

RUTH. *s.* (from *rue.*) 1. Mercy; pity; tenderness (*Fairfax*). 2. Misery; sorrow (*Spenser*).

RUTH (Book of), a canonical book of the Old Testament, being a kind of appendix to the book of Judges, and an introduction to those of Samuel; and having its title from the person whose interesting story is here principally related. In this story are observable the ancient rights of kindred and redemption; and the manner of buying the inheritance of the deceased, with other particulars of great note and antiquity. The canonicalness of this book was never disputed; but the learned are not agreed about the epocha of the history it relates. Ruth the Moabitess is found in the genealogy of our Saviour. Matth. i. 5.

RUTHERFORTH (Thomas, D.D.), an ingenious English philosopher, was the son of the Rev. Thomas Rutherforth, rector of Papworth Everard, in the county of Cambridge, who had made large collections for the history of that county.

Our author was born the 13th of October 1712. He studied at Cambridge, and became fellow of St. John's college, and regius professor of divinity, in that university; afterwards rector of Shenfield in Essex, and of Barley in Hertfordshire, and archdeacon of Essex. He died the 5th of October 1771, at 59 years of age.

Dr. Rutherforth, besides a number of theological writings, published, at Cambridge,

1. Ordo Institutionum Physicarum, 1743, in 4to.

2. A System of Natural Philosophy, in 2 vols. 4to, 1748. A work which has been much esteemed.

3. He communicated also to the Gentleman's Society at Spalding, a curious correction of Plutarch's description of the instrument used to renew the vestal fire, as relating to the triangle with which the instrument was formed. It was nothing else, it seems, but a concave speculum, whose principal focus, which collected the rays, is not in the centre of concavity, but at the distance of half a diameter from its surface. But some of the ancients thought otherwise, as appears from prop. 31 of Euclid's Catoptrics.

The writer of his epitaph says, "He was eminent no less for his piety and integrity, than his extensive learning; and filled every public station in which he was placed with general approbation. In private life, his behaviour was truly amiable. He was esteemed, beloved, and honoured by his family and friends; and his death was sincerely lamented by all who had ever heard of his well deserved character."

RU'THFUL. *a.* (*ruth* and *full.*) Rueful; woful; sorrowful (*Carew*).

RU'THFULLY. *ad.* 1. Wofully; sadly (*Knolles*). 2. Sorrowfully; mournfully (*Spenser*).

RUTHILE, in mineralogy, a species of TITANIUM, which see.

RUTHIN, a town in Denbighshire, with a market on Monday. It is seated in a vale, on the river Clwyd, and had a strong castle, now in ruins. It is 15 miles S.W. of Holywell, and 206 N.W. of London. Lon. 3. 30 W. Lat. 53. 7 N.

RU'THLESS. *a.* (from *ruth.*) Cruel; pitiless; uncompassionate; barbarous (*Sandys*).

RU'THLESSNESS. *s.* (from *ruthless.*) Want of pity.

RU'THLESSLY. *ad.* (from *ruthless.*) Without pity; cruelly; barbarously.

RUTIDOSIS, in medicine, a corrugation and subsiding of the cornea of the eye. The species are, 1. Rutidosis, from a wound or puncture penetrating the cornea. 2. Rutidosis, from a fistula penetrating the cornea. 3. Rutidosis, from a deficiency of the aqueous humour, which happens from old age, fevers, great and continued evacuations, and in extreme dryness of the air. 4. Rutidosis of dead persons, when the aqueous humour exhales through the cornea, and no fresh humour is secreted; so that the cornea becomes obscure and collapsed: this is a most certain sign of death.

RUTLAM, a town of Hindustan Proper, in the province of Malwa, 48 miles W. of Ougein, and 136 E. of Amedabad. Lon. 74. 58 E. Lat. 23. 25 N.

RUTLANDSHIRE, the smallest county of England, being only 15 miles long and 11 broad. It is supposed to have received its name from the red colour of the soil, which, in some parts, is a sort of ruddle. It is bounded on the W. and N.W. by Leicestershire, on the N. and N.E. by Lincolnshire, and on the S. and S.E. by Northamptonshire. It lies in the diocese of Peterborough, contains 48 parishes and two market-towns, and sends two members to parliament. The air is very good, and the soil rich. The principal rivers are the Welland and the Guash, or Wash. Oakham is the county-town. In 1801 this county contained 16,356, and in 1811, 16,380 inhabitants. See POPULATION.

RU'TTIER. *s.* (*routiere*, Fr.) A direction of the road or course at sea.

RUTTING TIME. The period of sexual orgasm among deer and other quadrupeds. It commences the latter end of August, and continues to the first and second week in October; during which both the stag and buck assume a degree of boldness in approaching man, that they never display at any other time of the year. At this season their necks swell; they range from one place to another incessantly, in seeming search of some object to attack; the voice of the stag is loud and alarming, to those who have not been accustomed to hear it. When opposed, they are so exceedingly strong and ferocious, that no common force can stand against them: they attack an individual in rutting time with a certainty of success. Some few years since, the locksmith who inspected the gate locks of Windsor Great Park weekly, was pursued by a stag, and when within a few yards of him, most luckily escaped by climbing a small tree, where he was kept in jeopardy near twenty-four hours, till the next day the stag made a retreat upon an accidental approach of the keepers. A short time after which, a girl, about fourteen years of age, passing through Hackwood Park, near Basingstoke, in Hampshire (and having on a red cloak), was attacked by a stag that not only perforated her body with his antlers in almost every part, but furiously tore her coloured cloak to pieces, so that the spot was covered with its rags; the whole corpse so maimed and disfigured, as to retain but little of the appearance of a human frame.

RU'TTISH. *a.* (from *rut.*) Wanton; libidinous; salacious; lustful; lecherous (*Shakspeare*).

RUTTUNPOUR, a city of the peninsula of Hindustan, in Orissa, and the capital of one of the western Mahratta chiefs. Lon. 82. 36 E. Lat. 22. 16 N.

RUYSCH (Frederic), an anatomist, of the Hague. He studied at Leyden and Franeker, and settled at the Hague, which he left to be anatomical professor at Amsterdam. He made a valuable collection of natural curiosities, which he was prevailed upon to present, for 30,000 florins, to the Czar Peter, when he visited Amsterdam. His anatomical works are very valuable, in 4 vols. 4to. He died 1731, aged 93. His son Henry, who died before him, published Theatrum universale omnium animalum, 2 vols. folio.

RUYSCHIANA, in botany, a genus of the class pentandria, order monogynia. Calyx five-leaved; corol of five reflected petals; styleless; berry undecided, many-seeded. Two species, parasitical shrubs of Martinique and Guiana.

RUYSCHIANA TUNICA. In anatomy, the internal surface of the choroid membrane of the human eye, which this celebrated anatomist imagined was a distinct lamina from the external surface.

RUVO, a populous town of Naples, in Terra di Bari, with a bishop's see, 16 miles W. of Bari. Lon. 16. 44 E. Lat. 41. 26 N.

RUZA, a town of Russia, in the government of Moscow, 48 miles W.N.W. of Moscow. Lon. 36. 2 E. Lat. 55. 46 N.

RYACOTTA, a town of Hindustan, in the Mysore country, 75 miles S. of Seringapatam, and 85 W.S.W. of Arcot. Lon. 76. 45 E. Lat. 30. 15 N.

RYAN (Loch), a lake in the N.W. angle of Wigtonshire. The sea flows into it through a narrow pass; and it was formerly crowded, in the season, with shoals of herrings.

RYANIA, in botany, a genus of the class polyandria, order monogynia. Calyx five-leaved, permanent, coloured; corolless; stigmas four; berry corky, one-celled, many-seeded. One species; a tree of Trinity Island, with alternate leaves, and one-flowered axillary peduncle.

RYDAL-WATER, a lake in Westmorland, a little to the W. of Ambleside. It is one mile in length, spotted with little islands, and communicates, by a narrow channel, with Grasmere-water to the W. and, by the river Rothay, with Windermere water to the S.

RYDROOG, a town and fortress of Hindustan, in the Mysore country, 128 miles N. of Seringapatam. Lon. 76. 52 E. Lat. 14. 40 N.

RYE, a borough in Sussex, with a market on Wednesday and Saturday. It is an appendage to the cinque ports, governed by a mayor and jurats, and sends two members to parliament. Its port is so choaked up with sand, that it can admit small vessels only. It exports corn, malt, hops, and other products of the country: and its fishermen send considerable supplies to the London market. It is 28 miles S.S.E. of Maidstone, and 63 S.E. of London. Lon. 0. 45 E. Lat. 51. 0 N.

RYE, in botany. See SECALE.

RYE-GRASS. See HUSBANDRY.

RYEGATE, a borough in Surry, with a market on Tuesday. It had a castle, some ruins of which are still to be seen; particularly a long vault, with a room at the end, large enough to hold 500 persons, where (according to tradition) the barons, who took up arms against king John, held their private meetings. It is seated in a valley, called Holmesdale, 16 miles E. of Guildford, and 21 S.W. of London. Lon. 0. 15 W. Lat. 51. 16 N.

RYER (Peter du), a dramatic writer, of Paris. He was in 1626 secretary to Lewis XIII. but in consequence of an imprudent marriage sold the place. He was afterwards secretary to the duke of Vendome. He wrote 19 dramatic pieces, and translated 13, which, according to Voltaire, were popular on the stage. He died 1658, aged 53.

RYMER (Thomas), an English antiquary and critic, was educated at the grammar-schoo of Northallerton, in Yorkshire, whence he was removed to Cambridge. He succeeded Mr. Shadwell as historiographer to king William III. His valuable collection of the Fœdra, continued after his death by Mr. Sanderson, extends to 20 vols. He was the author of A View of the Tragedies of the last Age, which shewed more spleen than judgment, and his remarks on Shakspeare are considered as very unreasonable. However, he was a good antiquary, and died in 1713.

RYNCHOPS. Skimmer. In zoology, a genus of the class aves, order grallæ. Bill straight, the upper mandible much shorter; the lower, truncate at the tip. One species only, rynchops nigra, black skimmer. Blackish, beneath white; bill red at the base; front and chin white; wings with a transverse white band; two middle tail-feathers black, the next edged with white; legs red.

Another variety, tawny, with black bill.

Inhabits America and Asia; twenty inches long: is perpetually flying about and skimming over water, out of which it scoops small fishes with its lower mandible; in stormy seasons frequents shores in search of shell-fishes.

RYSBRAECK (Peter), an eminent landscape painter of Antwerp, was born in 1657. His figures and trees are well designed, and he painted expeditiously, and with great spirit.

RYSWICK, a village in Holland, seated between Hague and Delft, where the prince of Orange has a palace. It is remarkable for a treaty concluded here in 1697, between England, Germany, Holland, France, and Spain.

RYTHMICAL. An epithet applied to the property, or quality, in the ancient melopœia and modern melody, by which the cadences, accents, and quantities, are regulated and determined.

RYTHMUS, in medicine, the number and rate of the pulse.

RYVES (Sir Thomas), born in the latter end of the 16th century, and educated at Winchester school, from whence he was sent to Oxford. He became a celebrated civilian in doctor's commons, and the court of admiralty. At the accession of Charles I. he was made king's advocate, and knighted. He died in 1651. He wrote several works, as The Vicar's Plea,—Historia Navalis Antiqua,—Historia Navalis Media, &c.

RYVES (Bruno), an English divine, and relation of sir Thomas. At the restoration of Charles II. he had the deanry of Windsor conferred on him, and was made secretary to the Garter. He died in 1677. He wrote Mercurius Rusticus, or the country's complaint, and several other works.

RZECZICA, a town of Lithuania, capital of a territory of the same name. It is seated at the confluence of the Wyedszwck and Dnieper, 125 miles N. of Kiof. Lon. 31. 5 E. Lat. 50. 32 N.

S.

S, A consonant, and the eighteenth letter of the alphabet, the sound of which is formed by driving the breath through a narrow passage between the palate and the tongue elevated near it, together with a motion of the lower jaw and teeth towards the upper; the lips being a little way open, with such a configuration of every part of the mouth and larynx, as renders the voice somewhat hissing.

S is, therefore, accounted one of the three hissing consonants; the other two being *z* and *j*. It is also held a semi-vowel, as forming a kind of imperfect sound, without the assistance of any of the vowels.

It is the peculiar quality of *s*, that it may be sounded before all consonants, except *x* and *z*, in which *s* is comprised, *x* being only *ks*, and *z* a hard or gross *s*. This *s* is, therefore, termed by grammarians *sucæ potestatis litera*. In the beginning of words it has invariably its natural and genuine sound; in the middle it is sometimes uttered with a stronger appulse of the tongue to the palate, like *z*, as *rose, busy*, &c. and sometimes it keeps its natural sound, as *loose, designation*, &c. In the end of monosyllables, it is sometimes *s*, as *this;* and sometimes *z*, as *as*, and generally in verbs where *es* stands for *eth*, as *gives*. A single *s* seldom ends any word, except the third person of verbs, as *loves*, the plural of nouns, as *trees*, the pronouns *this, his, ours, yours, us*, the adverb *thus*, and words derived from the Latin, as *rebus:* the close being always either in *se*, as *house*, or *ss*, as *grass*. It sounds like *z* before *ion*, if a vowel goes before, as *intrusion;* and like *s*, if it follows a consonant, as *conversion*. It sounds like *z* before *e* mute, as *refuse*, and before *y* final, as *rosy*. Johnson.

Some of the ancients avoided all use of the *s* very studiously; particularly Pindar, who has whole poems without once mentioning it. And hence also in Plautus, and some others of the Latin poets, we find it cut abruptly off, as in *dignu'*, *omnibu'*, &c. Others, on the contrary, affected the use of it every where, inserting it where it was not wanted; as *Casmenæ* for *Camenæ*, *dusmosæ* for *dumosæ*, *cæsna* for *cæna*, &c.

Of all other letters, the *s* is nearest akin to the *r;* whence it was frequently changed, on account of its disagreeable sound, into *r*. Thus the *Valerii*, *Furii*, &c. were at first called *Valesii*, *Fusii*, &c. and what we now call *ara, arena, carmen, feriæ, lares*, &c. were anciently wrote *asa, asena, casmen, fesiæ, lases*, &c. Add to this, that the Latin nouns now terminated in *or*, as *arbor, labor*, &c. all anciently ended in *s*; as *arbos, labos*, &c.

In the inflections of nouns, *s* is variously changed; sometimes into *r*, as *flos, floris*; sometimes into *n*, as *sanguis, sanguinis*; sometimes into *d*, as *pes, pedis*; sometimes into *t*, as *nepos, nepotis*. On the contrary, in verbs, it is frequently put for other letters; for *b*, as in *jubeo, jussi*; for *e*, as in *parco, parsi*; for *d*, as in *ludo, lusi*; for *g*, as in *spargo, sparsi*, &c.

The Latins also frequently changed the Greek *s* into *l*, as Ἀννίβας, *Annibal*; into *d*, as μέσον, *medium*, &c. The double *s* was frequently changed into *x*, as πίσσα, *pix*; and sometimes even the single one, as Αἴας, *Ajax*.

The old and the new orthography of the French differ chiefly in the use of the *s*; the latter omitting it in writing, where it is not heard in the pronunciation, and the former retaining it: thus the followers of the one, particularly the Academy in their dictionary, write *tempeste, huistre, fluste*; those of the other, *tempête, huître, flûte*, &c.

S was a numerical letter among the ancients, signifying seven: according to the verse,

S *vera septenos numeratos significabit.*

Among the Greeks, ϡ signified 200, and ϡ denoted 200,000; the *sigma* joined to *tau*, i. e. ϛ, denoted 6. The *samech* of the Hebrew ס denoted 50, and with two points above ס, it signified 50,000.

In abbreviations, S. stands for *societas*, or *socius*; as, R. S. S. for *Regiæ Societatis Socius*, i. e. *fellow of the Royal Society*. In medicinal precriptions, S. A. signifies *secundum artem*, i. e. *according to the rules of art*; and *ss* immediately following any quantity, imports *semis*, half. In the notes of the ancients, S. stands for *sextus, servius*, or *sanctus*; S. S. *sanctissimus*; S. P. for *spurius*; S. C. for *senatus consultum*; S. D. for *salutem dicit*; S. P. D. for *salutem plurimam dicit*; S. P. Q. R. for *senatus populusque Romanus*; S. S. S. for *stratum super stratum*, i. e. *one layer above another alternately*; S. V. B. E. E. Q. V. for *si vales bene est ego quoque valeo*, a form used in Cicero's time, in the beginning of letters. Upon the French coins, S distinguished those that were struck at Rheims.

S, in books of navigation, &c. signifies south; S. E. south-east; S. W. south-west; S. S. E. south-south-east, &c. See COMPASS.

S, in the Italian music, stands for SOLO.

SAAVEDRA (Michael de Cervantes), a celebrated Spanish writer, and the inimitable author of Don Quixote, was born at Madrid in 1549. From Spain he went to Italy, and served cardinal Aquaviva at Rome as chamberlain. Fighting under the banners of the victorious Marc Antonio Colonna, he lost his left hand in 1571. He was taken by the Moors, and suffered a captivity of five years and a half. On his return to Spain, he applied himself to writing for the stage, by which he acquired great fame. The first part of his Don Quixote was printed at Madrid in 1605. Notwithstanding the vast applause his book every where received, he suffered many difficulties from poverty. In 1615 he published a second part. He was the author of several other works, and died of a dropsy in 1616. His sickness was of such a nature, that he himself was able to be, and actually was, his own historian. At the end of the preface to the Troubles of Persiles and Sigismunda, he represents himself on horseback upon the road, and a student who had overtaken him, engaged in conversation with him: "And happening to talk of my illness (says he), the student soon let me know my doom, by saying it was a dropsy I had got; the thirst attending which, all the water of the ocean, though it were not salt, would not suffice to quench. Therefore, senor Cervantes, (says he), you must drink nothing at all, but do not forget to eat; for this alone will recover you without any other physic. I have been told the same by others, answered I; but I can no more forbear tippling, than if I were born to do nothing else. My life is drawing to an end; and from the daily journal of my pulse, I shall have finished my course by next Sunday at the furthest.—But adieu, my merry friends all; for I am going to die; and I hope to see you ere long in the other world, as happy as heart can wish." His dropsy increased, and at last proved fatal to him; yet he continued to say and write bons mots.

SAADAH, a strong and populous town of Arabia Felix, where much Turkey leather is made. It is 140 miles W.N.W. of Sanaa. Lon. 44. 55 E. Lat. 17. 50 N.

SAALEFELD, a town of Upper Saxony, in the principality of Altenburg. Here are manufactures of cloth and silk stuffs: it is likewise the mint-town for the circle of Upper Saxony. It stands on the Saal, 20 miles N.N.E. of Coburg, and 46 S.W. of Altenburg. Lon. 11. 22 E. Lat. 50. 31 N.

SAATZ, or ZATEC, a town of Bohemia, which gives name to a circle. It is situate on the Eger, 25 miles S.W. of Leutmeritz, and 44 S. of Dresden. Lon. 14. 15 E. Lat. 50. 16 N.

SABADILLA. See CAVADILLA.

SABÆANS, SABÆI, or SABIANS, the adherents to Sabaism; a sect of idolaters, much ancienter than Moses, and the Jewish law.

Hottinger sets aside the common derivation of Sabæan from צבא, militia, host; and will not have it the name of a sect of religion, but of a people in Arabia Felix, the descendants of Saba, grandson of Cham. But the critics, to a man, conspire against this opinion.

The word is sometimes also written Sabians, Sabaites, Zabæans, Zabians, Zabaites, Tsabæans, Tsabians, and Tsabaists.

The Sabæans were very numerous throughout the East: in later times they have mixed something of Christianity with their superstition. They set a great value on the baptism of St. John; whence they have also been denominated Christians of St. John.

Some, indeed, doubt whether the Sabæans be the same with the Christians of St. John; but father Angelo de St. Joseph, a Carmelite missionary, and Maracci, in his notes on the Alcoran, assert it expressly. Be this as it will, Mahomet, in his Koran, and the Arabian authors since him, make frequent mention of them. Beidavius, in his comment on the Koran, represents them as a kind of mean between the Christians and the Magusians, who are the followers of the Magi, among the Persians: he adds, that they pretend to be of the religion of Noah. Kessæus notes, that they pretend to be in possession of the books of Seth and Enoch; though they own none of the books of Scripture, except the book of Psalms.

Some charge them with worshipping the stars; and others, the angels or demons. Maimonides attributes both to them.

Abu Joseph Ascheus and Kessæus place the Sabæans about Charran, or Charræ, and Ghezira in Mesopotamia; which opinion is confirmed by this, that all their books are in the Chaldee tongue, though in a character very different from the Chaldee.

Sale, in his preliminary discourse to the Koran, p. 14, &c., has given the following brief account of the tenets and worship of this sect. They believe in the existence of one God, though they also pay an adoration to the stars, or the angels and intelligences which they suppose reside in them, and govern the world under the supreme Deity. They endeavour to perfect themselves in the four intellectual virtues, and believe the souls of wicked men will be punished for nine thousand ages, but will afterwards be received to mercy. They are obliged to pray three times a day, before sunrise, before noon, and before sun-set; and in praying they turn their faces, as some say to the north; according to others, to the south, to Mecca, or to the star to which they pay their devotion. They have three fasts in the year; the first lasts thirty days, the second nine days, and the last seven. They offer many sacrifices, of which they eat no part, but wholly burn them. They abstain from beans, garlic, and some other pulse and vegetables. They go on pilgrimage to a place near the city of Harran, or Charran, in Mesopotamia, where great numbers of them dwell; and they have also a great respect for the temple of Mecca, and the pyramids of Egypt; fancying these last to be the sepulchres of Seth, and of Enoch and Sabi, his two sons, whom they consider as the first propagators of their religion; and at these structures they sacrifice a cock and black calf, and offer up incense. This is one of the religions, the practice of which Mahomet tolerated (on

paying tribute), and the professors of it are often included in that expression of the Koran, "those to whom the Scriptures have been given," or literally, "people of the Book."

SABAISM, an ancient kind of idolatry; the first that ever entered into the world. See the preceding article.

SABA'OTH. (Heb.) Armies; hosts.

SABBATARIANS, a sect of Christians, chiefly Baptists, who observe the Jewish or Saturday Sabbath, from a persuasion that, it being one of the ten commandments, which they contend are all in their nature moral, was never abrogated by the New Testament. They say that Saturday must at least be deemed of equal validity for public worship with any day never particularly set apart by Jesus Christ and his Apostles. Those of this sect who are what are denominated Particular Baptists, hold, in common with most other christians of the present day, all the other doctrines of grace, as they are usually called, viz. the Trinity, Atonement, Divinity of Jesus Christ, &c. &c.

In our own country, this sect is by no means numerous. They have only two congregations in London; the one of General Baptists, and the other of Particular, or Calvinistic Baptists. In America, however, as we are informed by Morse and Winterbotham, there are many christians of this persuasion, particularly in Rhode Island, New Jersey, and at Ephrate in Pennsylvania.

SABBATH, in the Hebrew language, signifies rest. The seventh day was denominated the sabbath, or day of rest, because that in it God had rested from all his works which he created and made. From that time the seventh day seems to have been set apart for religious services; and, in consequence of a particular injunction, was afterwards observed by the Hebrews as a holy day. They were commanded to set it apart for sacred purposes in honour of the creation, and likewise in memorial of their own redemption from Egyptian bondage.

The importance of the institution may be gathered from the different laws respecting it. When the ten commandments were published from Mount Sinai in tremendous pomp, the law of the sabbath held a place in what is commonly called the first table, and by subsequent statutes the violation of it was to be punished with death. Six days were allowed for the use and service of man; but the seventh day God reserved to himself, and appointed it to be observed as a stated time for holy offices, and to be spent in the duties of piety and devotion. On this day, the ministers of the temple entered upon their week; and those who had attended on the temple service the preceding week went out at the same time. New loaves of shew bread were placed upon the golden table, and the old ones taken away. Two lambs for a burnt offering, with a certain proportion of fine flour, mingled with oil, for a bread-offering, and wine for a libation, were offered. The sabbath, as all other festivals, was celebrated from evening to evening. It began at six in the evening on Friday, and ended at the same time the next day.

Concerning the time at which the sabbath was first instituted, different opinions have been held. Some have maintained, that the sanctification of the seventh day, mentioned in Gen. ii. is only there spoken of διὰ προλήψιν or by anticipation; and is to be understood of the sabbath afterwards enjoined the children of Israel at the commencement of the Mosaic dispensation. But without entering into a particular examination of all the arguments adduced to support this opinion, a few observations, it is presumed, will be sufficient to show that it rests on no solid foundation.

It cannot easily be supposed that the inspired penman would have mentioned the sanctification of the seventh day amongst the primeval transactions, if such sanctification had not taken place until 2500 years afterwards. Writers, ambitious of that artificial elegance which the rules of criticism have established, often bring together in their narratives events which were themselves far distant, for the sake of giving form to their discourse; but Moses appears to have despised all such flimsy refinements, and to have constructed his narrative in great conformity to the series of events.

From the accounts we have of the religious service practised in the patriarchal age, it appears that, immediately after the Fall, when Adam was restored to favour through a Mediator, a stated form of public worship was instituted, which man was required to observe in testimony, not only of his dependence on the Creator, but also of his faith and hope in the promise made to our first parents, and seen afar off. Of an institution then so grand and important, no circumstance would be omitted that is necessary to preserve it, or that contributes to render the observance of it regular and solemn.

That determined times are necessary for the due celebration of divine service, cannot be denied. Such is the constitution of man, that he must have particular times set apart for particular services. He is doomed to toil and labour; to earn his bread in the sweat of his face; and is capable of performing religious duties only in such a manner as is consistent with his situation in the world. If stated times for religious solemnities had not been enjoined, the consequence would have been, that such solemnities would have been altogether neglected; for experience shows, that if mankind were left at liberty when and how often they should perform religious offices, these offices would not be performed at all. It is the observation of holy times that preserves the practice of holy services; and without the frequent and regular returns of hallowed days, man would quickly forget the duty which he owes to God, and in a short time no vestige of religion would be found in the world.

Among the ordinances which God vouchsafed his ancient people, we find that the pious observation of holydays was particularly insisted upon; and the sabbath was enjoined to be kept holy, in the most solemn manner, and under the severest penalties. Can it then be supposed that he would suffer mankind, from the creation of the world to the Mosaic era, to re-

main without an institution so expedient in itself, and as well fitted to answer the end proposed by it, under the one dispensation as ever it could be under the other? No; we have every imaginable reason to conclude, that when religious services were enjoined, religious times were appointed also; for the one necessariiy implies the other.

It is no objection to the early institution of the sabbath, that there is no mention of it in the history of the patriarchal age. It would have swelled the Bible to a most enormous size had the sacred historian given a particular account of all the transactions of those times; besides, it would have answered no end. When Moses wrote the book of Genesis, it was unnecessary to relate minutely transactions and institutions already well known by tradition: accordingly we see, that his narrative is everywhere very concise, and calculated only to preserve the memory of the most important facts. However, if we take a view of the church-service of the patriarchal age, we shall find, that what is called the legal dispensation, at least the liturgic part of it, was no new system, but a collection of institutions observed from the beginning, and republished and formed by Moses. The Scriptures inform us that Cain and Abel offered sacrifices; and the account which is given of the acceptance of the one, and the rejection of the other, evidently shows that stated laws respecting the service had then taken place. "In process of time," at the end of the days, "Abel brought an offering." Here was priest, altar, matter of sacrifice, appointed time, motive to sacrifice, atonement made, and accepted. The distinction of animals into clean and unclean before the Flood, and Noah's sacrifice immediately after his deliverance, without any new direction, is an unanswerable proof of the same truth. It is testified of Abraham, by God himself, that he kept his charge, his commandments, his statutes, and his laws. These expressions comprehend the various branches into which the law given at Sinai was divided. They contain the moral precepts, affirmative and negative, the matter of religious service, a body of laws to direct obedience, and to which man was to conform his conduct in every part of duty. Agreeably to this, we find that sacrifices were offered, altars and places of worship consecrated, and the sabbath also mentioned as a well known solemnity, before the promulgation of the law. It is expressly taken notice of at the fall of manna; and the incidental manner in which it is then mentioned, is a convincing proof that the Israelites were no strangers to the institution: for, had it been a new one, it must have been enjoined in a positive and particular manner, and the nature of it must have been laid open and explained, otherwise the term would have conveyed no meaning.

The division of time into weeks, or periods of seven days, which obtained so early and almost universally, is a strong indication that one day in seven was always distinguished in a particular manner. Week, and seven days, are in scripture language synonimous terms. God commanded Noah, seven days before he entered the ark, to introduce into it all sorts of living creatures. When the waters of the flood began to abate, Noah sent forth a dove, which, finding no rest for the sole of her foot, returned to him. After seven days he sent forth the dove a second time, and again she returned to the ark. At the expiration of other seven days, he let go the dove a third time: and a week is spoken of (Gen. xxix.) as a well known space of time.

This septenary division of time has been, from the earliest ages, uniformly observed over all the eastern world. The Israelites, Assyrians, Egyptians, Indians, Arabians, and Persians, have always made use of a week, consisting of seven days. Many vain attempts have been made to account for this uniformity; but a practice so general and prevalent could never have taken place, had not the septenary distribution of time been instituted from the beginning, and handed down by tradition.

From the same source also must the ancient heathens have derived their notions of the sacredness of the seventh day. That they had such notions of it is evident from several passages of the Greek poets, quoted by Aristobulus, a learned Jew, by Clement of Alexandria, and Eusebius.

——— εβδομη, ιερον ημαρ. Hesiod.
The seventh, the sacred day.

Εβδοματη δ' επειτα κατηλυθεν, ιερον ημαρ. Homer.
Afterwards came the seventh, the sacred day.

Again:

Εβδομον ημαρ ην, και τω τετελεστο παντα.
On the seventh day, all things were completed.

Εβδοματη δηοι τετελησμενα παντα τετυκται. Linus.
All things were made perfect on the seventh day.

That they likewise held the number seven in high estimation has been shown by a learned, though sometimes fanciful, author, with such evidence as to enforce conviction. The Pythagoreans call it the venerable number, σεβασμου αξιος, worthy of veneration, and held it to be perfect, and most proper to religion. They denominated it fortune, and also styled it voice, sound, muse, because, no doubt, seven distinct notes comprehend the whole scale of music, beyond which neither voice nor instrument can go, but must return from the seventh, and begin again anew. They likewise designed it τελεσφορος, leading to the end. Seven, in the Hebrew language, is expressed by a word that primarily signifies fulness, completion, sufficiency, and is applied to a week, or seven days, because that was the full time employed in the work of creation; to the sabbath, because on it all things were completed; and to an oath, because it is sufficient to put an end to all strife. This opening of the Hebrew root will enable us to come at the meaning of those expressions of the heathens, and also let us see whence they derived their ideas and modes of speaking, and that the knowledge of the transactions at the creation, though much perverted, was never entirely lost by them.

As the seventh day was observed by the Jew-

ish church, in memory of the rest of God after the works of creation, and their own deliverance from Pharoah's tyranny; so the first day of the week has always been observed by the christian church in memory of the resurrection of Jesus Christ, by which he completed the work of man's redemption on earth, and rescued him from the dominion of him who has the power of death.

This day was denominated by the primitive Christians the Lord's day. It was also sometimes called Sunday; which was the name given to it by the heathens, who dedicated it to the sun. And, indeed, although it was originally called Sunday by the heathens, yet it may very properly retain that name among Christians, because it is dedicated to the honour of "The true light, which lighteth every man that cometh into the world," of Him who is styled by the prophet "The Sun of righteousness," and who on this day arose from the dead. But although it was, in the primitive times, indifferently called the Lord's day or Sunday, yet it was never denominated the sabbath; a name constantly appropriated to Saturday, or the seventh day, both by sacred and ecclesiastical writers.

Of the change from the seventh to the first day of the week, or even of the institution of the Lord's day festival, there is no account in the New Testament. However, it may be fairly inferred from it, that the first day of the week was, in the apostolic age, a stated time for public worship. On this day the apostles were assembled, when the Holy Ghost came down so visibly upon them to qualify them for the conversion of the world. On this day we find St. Paul preaching at Troas, when the disciples came to break bread: and the directions which the same apostle gives to the Corinthians concerning their contributions for the relief of their suffering brethren, plainly allude to their religious assemblies on the first day of the week.

Thus it would appear from several passages in the New Testament, that the religious observation of the first day of the week is of apostolical appointment; and may, indeed, be very reasonably supposed to be among those directions and instructions which our blessed Lord himself gave to his disciples, during the 40 days between his resurrection and ascension, wherein he conversed with them, and spoke of the things pertaining to the kingdom of God. Still, however, it must be owned that those passages, although the plainest that occur, are not sufficient to prove the apostolical institution of the Lord's day, or even the actual observation of it. In order, therefore, to place the matter beyond all controversy, recourse must be had to ecclesiastical testimony.

From the consentient evidence and uniform practice of the primitive church, and also from the attestation of Pliny, a heathen of no mean figure both in learning and power, we find that the first day of the week was observed in the earliest ages as a holiday or festival, in honour of the resurrection of Christ. Now there are but two sources whence the custom could possibly have arisen. It must have been instituted either by human or divine authority: by human authority it was not instituted; for there was no general council in those early times, and without the decree of a general council it was impossible that any ecclesiastical institution could have been universally established at once. It remains, therefore, that it must have been instituted by divine authority: and that it really was so, will further appear from the following considerations. It is certain that the apostles travelled over the greatest part of the world, and planted churches in the remotest parts of it. It is certain, also, that they were all led by the same spirit; and their desire was, that unity and uniformity should be observed in all the churches which they had founded. It is not therefore surprising that, in the primitive times, the same doctrine, the same worship, the same rites and customs, should prevail all over the Christian world; nay, it would have been unaccountable had the case been otherwise. For this reason we may conclude that every custom, universally observed in the early ages of the Christian church, and not instituted by a general council, was of original appointment.

As the Lord's day is sanctified, that is, set apart to Christians for the worship and service of God, their Creator, Redeemer, and Sanctifier, a little consideration will easily discover how it ought to be observed. Although a day separated from worldly business, yet it is in no sense a day of idleness, but a season appropriated to the works of salvation and labours of charity.

In the primitive times this holy day was observed in the most solemn manner. From the monuments of those early ages we learn, that it was spent in a due and constant attendance on all the offices of divine worship. On it they held their religious assemblies, in which the writings of the apostles and prophets were read to the people, and the doctrines of Christianity further pressed upon them by the exhortations of the clergy. Solemn prayers and praises were offered up to God, and hymns sung in honour of Christ; the Lord's supper was constantly celebrated; and collections were made for the maintenance of the clergy and the relief of the poor. On this day they abstained, as much as they could, from bodily labour. They looked upon it as a day of joy and gladness; and, therefore, all fasting on it was prohibited, even during the season of Lent, their great annual fast.—Such was the zeal of those times, that nothing, no not the severest persecutions, hindered them from celebrating holy offices on this day. They were often beset and betrayed, and as often slaughtered in consequence of cruel edicts from emperors, those very emperors for whose happiness and prosperity they always offered up their fervent prayers. For this cause, when they could not meet in the day-time, they assembled in the morning before it was light; and when sick, in exile, or in prison, nothing troubled them

more than that they could not attend the service of the church. No trivial pretences were then admitted for any one's absence from public worship; for severe censures were passed upon all who were absent without some urgent necessity. When the empire became Christian, Constantine and his successors made laws for the more solemn observation of the Lord's day. They prohibited all prosecutions and pleadings and other juridical matters to be transacted on it, and also all unnecessary labour: not that it was looked upon as a Jewish sabbath, but because these things were considered as inconsistent with the duties of the festival.

But although the primitive Christians did not indulge themselves in the practice of unnecessary labour or trifling amusements, yet they did not wholly abstain from working, if great necessity required it. The council of Laodicea enjoined that men should abstain from work on the Lord's day if possible; but if any were found to judaize, they were to be censured as great transgressors. So circumspect were the primitive Christians about their conduct on this festival, that on the one hand they avoided all things which tended to profane it, whilst, on the other, they censured all those who insisted it should be observed with Pharisaical rigour.

The primary duty of the Lord's day is public worship. The nature and design of the Christian religion sufficiently shows the necessity and importance of assembling for the duties of devotion. The whole scope of Christianity is to bring us to an union with God, which cannot be obtained or preserved without frequent communications with him; and the reasons which show religious intercourse to be the indispensable duty of Christians in a private capacity, will bind it with equal or more force on them, considered as a community.

The advantages of public worship, when duly performed, are many and great. There are two, however, which deserve to be considered in a particular manner. It gives Christians an opportunity of openly professing their faith, and testifying their obedience to their Redeemer in the wisest and best manner; and in an age when atheism has arisen to an alarming height, when the Son of God is crucified afresh, and put to open shame, every man, who has any regard for religion, will cheerfully embrace all opportunities of declaring his abhorrence of the vicious courses pursued by those degenerate apostates. He will with pleasure lay hold on every occasion to testify that he is neither afraid nor ashamed to confess the truth; and will think it his indispensable duty openly to disavow the sins of others, that he may not incur the guilt of partaking of them.

Public worship preserves in the minds of men a sense of religion, without which society could not exist. Nothing can keep a body of men together and unite them in promoting the public good, but such principles of action as may reach and govern the heart. But these can be derived only from a sense of religious duties, which can never be so strongly impressed upon the mind as by a constant attendance upon public worship. Nothing can be more weak than to neglect the public worship of God, under the pretence that we can employ ourselves as acceptably to our Maker at home in our closets. Both kinds of worship are indeed necessary; but one debt cannot be paid by the discharge of another. By public worship every man professes his belief in that God whom he adores, and appeals to Him for his sincerity, of which his neighbour cannot judge. By this appeal he endears himself more or less to others. It creates confidence; it roots in the heart benevolence, and all other Christian virtues, which produce, in common life, the fruits of mutual love and general peace.

People in general are of opinion that the duties of the Lord's day are over when public worship is ended. But they seem to forget for what purposes the day was set apart. It is not only appropriated to the duties of public worship, but also sanctified to our improvement in the knowledge of the doctrines of Christianity. It is an institution calculated to alleviate the condition of the laborious classes of mankind, and, in consequence of that, to afford rest to beasts also. It is proper, it is necessary, that man should reflect on his condition in the world, that he should examine the state of his soul, and inquire what progress he has made in that work which was given him to do. Those that have children or servants are obliged to look after their instruction as well as their own. These are the ends which the institution of Sunday was designed to answer. Every man must allow that these things must be done at some time or other; but unless there be set times for doing them, the generality of mankind would wholly neglect them.

Visiting and travelling, though very common, are enormous profanations of this holy day. Families are thereby robbed of their time; a loss for which no amends can ever be made them: servants, instead of having leisure to improve themselves in spiritual knowledge, are burthened with additional labour: and in a man of any humanity, it must excite many painful sensations, when he reflects how often the useful horse on that day experiences all the anguish of hunger, torn sides, and battered knees. Every kind of amusement, every kind of common labour, is an encroachment on the particular duties of the Lord's day; and consequently men profane the day by spending it in any amusements, or undertaking upon it any ordinary employment, unless it be a work of absolute necessity.

SABBATH DAY'S JOURNEY, a Jewish itinerary measure. It is generally stated, by the Jews, to be two thousand cubits, or about a mile, being the distance between the ark and the camp, when they marched. Josh. iii. 4. But the camp occupied a large extent of ground, and this was only the distance of those

who encamped nearest to the ark; for it is evident, that as all the people were to repair, on the sabbath, to the place of God's public worship, a sabbath day's journey was more than 2000 cubits to those whose station in the camp was more remote from the ark. Yet, when they were afterwards settled in towns, they allowed no more than 2000 cubits for a sabbath day's journey. See Selden de Jur. Nat. & Gent. lib. iii. cap. 9.

SA'BBATHBREAKER. *s.* (*sabbath* and *break.*) Violator of the sabbath by labour or wickedness (*Bacon*).

SABBA'TICAL. *a.* (*sabbaticus*, Latin.) Resembling the sabbath; enjoying or bringing intermission of labour (*Forbes*).

SA'BBATISM. *s.* (from *sabbatum*, Latin.) Observance of the sabbath superstitiously rigid.

SABELLA, in zoology, a genus of the class vermes, order testacea. Animal a nereis, with a ringent mouth and two thicker tentacles behind the head; shell tubular, composed of particles of sand, broken shells, and vegetable substances, united to a membrane by a glutinous cement. Twenty-five species, natives chiefly of Germany; a few of India and America; three or four of our own country; inhabiting coasts or rivers, and often affixed to stones. We shall give one specimen in sabella alveolata. This is composed of numerous parallel tubes communicating by an aperture, forming, in the mass, an appearance of honeycombs. Inhabits the coasts of our own country and of other parts of Europe, covering rocks for a considerable space, and easily breaking under the feet. The shell is composed chiefly of sand, and very fine fragments of comminuted shells, from two to three inches long.

SABELLIANS, in ecclesiastical history, a sect in the East, who reduced the three persons in the Trinity to three states or relations; or rather reduced the whole Trinity to the one person of the Father; making the Word and the Holy Spirit to be only virtues, emanations, or functions thereof.

Sabellius, their chief, first broached this doctrine, in the third century, about the year 255, in a city of Lybia called Ptolemais. He taught, according to Epiphanius, that the same being is Father, Son, and Holy Ghost; so that there are only three denominations in one hypostasis or subsistence; or, as in man, body, soul, and spirit. He says, that the Sabellians agreed with the Noetians, except in one thing, viz. that they said, the Father did not suffer. Theodoret's account of Sabellius is, that he taught the Father and the Son and the Holy Spirit to be one hypostasis or subsistence, and one person with three names; that he speaks of the same sometimes as Father, sometimes as Son, and sometimes as Holy Ghost; and says, that in the Old Testament he delivered the law as Father, and in the New dwelt among men (or was incarnate) as the Son, and descended on the apostles, as the Holy Spirit. Augustin repeatedly says, that there was no difference in opinion between Noetus and Sabellius; and that the Sabellians, as well as the Noetians, taught the Father to have suffered; and that they were oftener called Patripassians than Sabellians. Lardner's Credibility, vol. vi. p. 446, &c. p. 600, &c.

Epiphanius tells us, that the god of the Sabellians, whom they called the Father, resembled the sun, and was a mere substratum; whereof the Son was the illuminative virtue or quality, and the Holy Spirit the warming virtue.

The Word, they taught, was shot or darted forth like a divine ray, to accomplish the work of redemption; and that being reascended to heaven, as the ray returns to its source, the warmth of the Father was communicated, after a like manner, to the apostles.

The council of Antioch, held by the Eusebians in 345, tells us, that, at Rome, those were called Patripassians, who in the East were called Sabellians.

The Sabellian hypothesis is sometimes embraced in the present day; but those who adopt it are nowhere, that we are aware of, sufficiently numerous to form a respectable congregation.

SABELLICUS (Mark Anthony Coccius), flourished in the 15th century. He was born at a little town in Italy, upon the Teveron. He was professor of polite literature at Vicenza, and died at the age of 70.

SABELLIUS. See SABELLIANS.

SABIANS. See SABÆANS.

SABINA, a province of Italy, in the Ecclesiastical State, 28 miles long and 20 broad; bounded on the N. by Umbria, E. by Naples, S. by Campagna di Roma, and W. by the patrimony of St. Peter. It is watered by several small rivers, and abounds in oil and wine. Magliano is the capital.

SABINA. (named from the Sabines, whose priests used it in their religious ceremonies.) Savine. Juniperus sabina of Linnæus. Juniperus foliis oppositis erectis decurrentibus, oppositionibus pyxidatis. C. dioecia. O. monadelphia. The leaves and tops of this plant have a moderately strong smell of the disagreeable kind, and a hot, bitterish, acrid taste; it is a powerful and active medicine, and has been long reputed the most efficacious in the materia medica, for producing a determination to the uterus, and thereby proving emmenagogue; it heats and stimulates the whole system very considerably, and is said to promote the fluid secretions. Externally savine is recommended as an escharotic to foul ulcers, syphilitic warts, &c. A strong decoction of the plant in lard forms an useful ointment to keep up a constant discharge from blisters, &c. See JUNIPERUS.

SABINI (Sabines), an ancient people of Italy, reckoned among the Aborigines. Some suppose that they were originally a Lacedæmonian colony planted there by Sabinus, a Spartan. The possessions of the Sabines were situated in the neighbourhood of Rome, between the river Nar and the Anio, and bounded on

the N. by the Apennines and Umbria, S. by Latium, E. by the Æqui, and Etruria on the W. The Sabines are celebrated in ancient history as being the first who took up arms against the Romans, to avenge the rape of their females. The greatest part of the Sabines migrated to Rome, where they settled, and were ranked as Roman citizens. Their chief cities were Cures, Fidenæ, Reate, Crustumerium, Corniculum, Nomentum, Collatia, &c.

SABINUS. This name was common to many eminent Romans, the most remarkable of whom are the following.—1. Aulus, a Latin poet intimate with Ovid.—2. A man from whom the Sabines received their name. (See SABINI.) He received divine honours after death, and was one of those deities whom Æneas invoked when he entered Italy.—3. Julius, an officer who proclaimed himself emperor in the beginning of Vespasian's reign. He was soon after defeated in a battle, and to escape from the conqueror, he hid himself in a cave with two faithful domestics, where he continued unseen for nine successive years. His wife found out his retreat, and spent her time with him, till her frequent visits to the cave discovered his concealment. He was dragged before Vespasian, and was, by his orders, put to death, though his wife shewed him the twins whom she had brought forth in the subterraneous retreat.—4. Titius, a Roman senator shamefully accused and condemned by Sejanus. His body, after execution, was dragged through the streets of Rome. His dog constantly followed the corpse, and when thrown into the Tiber, the faithful animal plunged in after it, and was drowned.—5. Poppæus, a Roman consul, who presided above 24 years over Mœsia, and obtained a triumph for his victories over the barbarians. He was a great favourite of Augustus, and of Tiberius.—6. Flavius, a brother of Vespasian, killed by the populace. He was well known for his fidelity to Vitellius. He commanded in the Roman armies 35 years, and was governor of Rome for 12 years.

SABINUS (George), one of the best Latin poets of his time, was born in the electorate of Brandenburg, in 1508; he was professor of the belles lettres at Frankfort on the Oder, rector of the new academy at Konigsberg, and counsellor to the elector of Brandenburg; and died in 1560.

SABIONCELLO, a town of Dalmatia, in the republic of Ragusa, situate on the extremity of a peninsula, to which it gives name. This peninsula runs a considerable way into the Atlantic, having the island of Lesia on the N. and those of Curzola and Melida on the S. all separated by a narrow channel. The town is 45 miles N.W. of Ragusa. Lon. 17. 40 E. Lat. 43. 20 N.

SABIONETTA, a town of Italy, in the Milanese, capital of a principality of the same name, with a strong citadel. It is 20 miles E. of Cremona.

SABLE (American), in natural history. See MUSTELA.

SABLE, in heraldry, signifies black; and is borrowed from the French, as are most terms in this science: in engraving it is expressed by both horizontal and perpendicular lines crossing each other. The occasion that introduced this colour into heraldry is thus related by Alexander Nisbet, p. 8. The duke of Anjou, king of Sicily, after the loss of that kingdom, appeared at a tournament in Germany all in black, with his shield of that tincture, *semé de larmes*, i. e. besprinkled with drops of water, to represent tears, indicating by that both his grief and loss. See HERALDRY.

SABLE, a town of France, in the department of Sarte, near which are some quarries of black marble. It is seated on the Sarte, 25 miles N.E. of Angers.

SABLE (Cape), the most southerly point of Nova Scotia, near which is a fine cod-fishery. Lon. 65. 39 W. Lat. 43. 23 N.

SABLES D'OLONNE, a town of France, in the department of Vendée, with a port capable of containing vessels of 150 tons. It is seated on the bay of Biscay, 40 miles W. of Fontenay le Compte. Lon. 1. 50 W. Lat. 46. 28 S.

SABLESTAN, a province of Persia, bounded on the N. by Candahar, E. by Hindustan, S. by Makran, and W. by Segestan. It is a mountainous country, little known to Europeans. Bost is the capital.

SA'BLIERE. *s.* (French.) 1. A sand-pit (*Bailey*). 2. (In carpentry.) A piece of timber as long, but not so thick, as a beam.

SABLIERE (Anthony de ambouillet de la), a French poet, who died at Paris in 1680. His madrigals, which are much celebrated, were published after his death by his son. His wife Hesselin de la Sabliere, who was visited by all the wits of her time, has been immortalized by La Fontaine in his poems, by way of gratitude for an asylum he found in her house for near 20 years.

SA'BRE. *s.* (*sabre*, French.) A cimeter; a short sword with a convex edge; a falchin (*Pope*).

SABRE-SHAPED LEAF. In botany, folium acinaciforme. See ACINACIFORM.

SABULO'SITY. *s.* (from *sabulous*.) Grittiness; sandiness.

SA'BULOUS. *a.* (*sabulum*, Latin.) Gritty; sandy.

SABURANUS, an officer of the pretorian guards. When appointed to this office by Trajan, the emperor presented him with a sword, saying, "Use this weapon in my service as long as my commands are just, but turn it against my own breast, whenever I become cruel or malevolent."

SACAI, a city and seaport of Japan, in the island of Niphon, with several castles, temples, and palaces, and a mountain on one side which serves as a rampart. It is 43 miles S. by W. of Miaco. Lon. 136. 5 E. Lat. 34. 58 N.

SACBUT. A bass wind instrument resembling the trumpet, so contrived as to be capable of being drawn out to different lengths, according to the acuteness and gravity of the scale required.

The sacbut is usually about eight feet long, and when extended to its full length, about fifteen. There are, however, sacbuts of different sizes to execute different parts; particularly a small one called by the Italians *trombone picciolo*, and the Germans *cleine alt possaune*, proper for the counter-tenor.

Respecting the sacbut of the ancient Hebrews, so various have been the conjectures of commentators, that their opinions form no satisfactory information to the curious enquirer. Indeed, scarce any ancient instrument has been heard of for which the sacbut, or the psaltery, have not furnished a name.

SACCADE, in the manage, a jerk, more or less violent, given by the horseman to the horse, in pulling or twitching the reins of the bridle, all on a sudden, and with one pull; to correct a horse that lies heavy upon the hand, or obstinately arms himself. This is used to make the horse carry well: though it ought to be used discreetly, and but seldom.

SACCHARI ACIDUM. Acid of sugar. If one part of sugar be distilled with three parts of nitric acid, till nitrous gass ceases to be developed, and then re-distilled with three parts of the same acid, a white crystallized salt is found in the liquid residue, which is the acid of sugar.

SA'CCHARINE. *a.* (*saccharum*, Latin.) Having the taste, or any other of the chief qualities of sugar (*Arbuthnot*).

SACCHARUM. Sugar-cane. In botany, a genus of the class triandria, order digynia. Calyx two-valved, invested on the outside with very long wool; corol two-valved. Eleven species; natives of the East or West Indies; one of Europe. The following is chiefly worthy of notice.

S. officinarum. Common sugar-cane. Flowers panicled, leaves flat; valves of the calyx lanceolate, bearded at the base. It is a native of both the Indies and of the islands of the South Sea, and is cultivated for its valuable uses. It has a jointed, reed-root, from which ascend four or more shoots proportionable to the age and strength of the root, eight or ten feet high according to the goodness of the ground: in some moist rich soils the cane has measured nearly twenty feet; but these are seldom so productive as those of a more moderate height; the canes are jointed, and the joints themselves are longer or shorter according to the nature of the soil. A leaf is placed at each joint, and its base embraces the stalk of the next joint above its insertion before it expands; hence to the point it is three or four feet in length according to the vigour of the plant; it has a deep, whitish, broad and permanent hollow midrib, or furrow on the under side; the edges are thin, and armed with small sharp teeth, scarcely to be discerned by the naked eye, but which will cut the skin of a delicate hand if drawn over them; the flowers are produced in panicles upon the top of the stalks; the spikes are from two to three feet long, and composed of various spikes nine or ten inches in length, and which are again subdivided into smaller spikes. All these have a portion of long down inclosing the flowers so as to conceal them from the sight: the seeds are oblong-pointed, and ripen in the flower.

There are three remarkable varieties mentioned by Loureiro, differing, not in the flower, but in the culm: the white sugar-cane; culm long, white, of a middling-size, very sweet, the knots distant: the red sugar-cane, culm short, thicker, red, very juicy, the knots approximate: the elephantine sugar-cane, knots very thick, red, long, less sweet, knots approximate.

The plant is capable of increase by slips or suckers from the root, and by cuttings from the main stalk: in our greenhouses, it is usually cultivated by slips from the bottom, or by side-shoots from the stem near the root; these may be taken off at any season in which they appear fit for the purpose, some fibres being detached along with them; they should then be planted separately in pots of rich earth, and plunged into a bark-bed, and be watered and occasionally shaded till they have taken root. They may then be treated as other greenhouse plants.

In its natural climate the cane usually grows to perfection in about fourteen months; it is planted by cuttings in parallel furrows, the cuttings laid level and even, and covered over with earth. When ripe, the reeds are cut off at a joint near the root, are then cleared of the leaves, tied up in bundles, and sent to the mills, which are worked either by water or horses.

The bottom part of the sugar-cane is about the thickness of the middle finger, and as it contains a good deal of the natural sweetness of the plant, it is usually cut into pieces of an inch and a half long, and given to the saddle horses in the West Indies, as a very nourishing food. The mill-horses, mules, and asses are likewise fed, during crop-time, on sugar-cane tops and the skimmings of the sugar-coppers, which last must be given sparingly at first, as it is apt to gripe them till they are a little accustomed to it.

For the process of extracting sugar and melasses from the cane, as also for that of refining it, see the article SUGAR.

SACCHARUM CANADENSE. The sugar obtained from a species of maple-tree, the acer pseudo-platanus of Linnéus, in Canada, and imported into some parts of Europe. It is supposed to be efficacious in disorders of the breast. Every part of the plant contains a sweet saccharine juice. The trunk, root, or branches, wounded early in the spring, bleed a large quantity of clear liquor, which in its dilute state tastes somewhat sweetish, and being inspissated, yields the concrete sugar, with a syrupy matter resembling melasses. The unboiled juice has been drank as an antiscorbutic. The Canada sugar is much esteemed in France in disorders of the breast. See SUGAR.

SACCHARUM SATURNI. See CERUSA ACETATA.

SACCHOLATS, in chemistry, salts formed by an union of the SACCHOLACTIC ACID, which see, with various bases. Scheele is the chief experimentist who has examined them, and the following are the principal results of his enqui-

ries. 1. Saccholat of potass, small crystals soluble in eight times their weight of water. 2. Saccholat of soda, the same, soluble in five times their weight of water. 3. Saccholat of ammonia, has a sourish taste: heat separates the ammonia. Saccholat of lime, of barytes, of magnesia, and of alumina, are all insoluble in water.

The saccholat of potass, though it maybe made to dissolve in water as above, in a great degree becomes deposited in cooling. As the saccholat of soda is much more soluble, if to a saturated solution of this salt, some potash be added, a copious deposition of small crystals of saccholat of potass takes place, owing to the superior affinity of the acid for potash. As this acid forms with all the earths salts insoluble in water, it decomposes the soluble salts of the same earths, such as the nitrats, and the muriats, and forms a white precipitate with them. It also decomposes in the same manner the solutions of silver, mercury, and lead.

SACCHOLACTIC ACID, an acid of peculiar properties, obtained from what is called the sugar of milk, and the process for procuring which we must first describe.

If the whey obtained from milk by coagulation be gently evaporated to the consistence of a syrup, and allowed to cool undisturbed, it will deposit a singular, crystalline, sweetish matter called sugar of milk, which is prepared pretty largely in some of the Swiss cantons, and is used for culinary and medicinal purposes. The whey made use of in these cantons is obtained from skimmed milk, and after being boiled down to the consistence of syrup is poured into earthen pots, and becomes solidified and dry upon exposure to the sun. The mass is first brown and impure, but is refined by resolution, clarification with the white of egg, and another evaporation; after which it concretes into white rhomboidal crystals. This is its form when pure; its taste is sweetish, and rather mawkish; it is soluble in about four parts of boiling water, and about twelve of cold. When strongly heated, it turns brown, swells up, and exhales the strong pungent vapour of burnt sugar, and finally leaves a black coal holding about $\frac{1}{38}$ of its weight of salt, composed, according to Rouelle, of three parts muriat of potash, and one part carbonat of potash.

Sugar of milk has been usually thought to be the chief agent in the vinous fermentation which milk is capable of assuming: but it has been shewn by Fourcroy and Vauquelin that this is a mistake, since during the process no sugar of milk is destroyed, as much being found after as before fermentation. Neither is it capable of fermenting by itself when dissolved in water, and mixed with leaven.

From this substance a peculiar acid was first obtained by Scheele in 1780. After having obtained oxalic acid from sugar, he wished to examine whether the sugar of milk would furnish the same product. Upon four ounces of pure sugar of milk, finely powdered, he poured twelve ounces of diluted nitric acid, and put the mixture into a large glass retort, which he placed in a sand-bath. A violent effervescence ensuing, he was obliged to remove the retort from the sand-bath till the commotion ceased. He then continued the distillation till the mixture became yellow. As no crystals appeared in the liquor remaining in the retort after standing two days, he repeated the distillation as before, with the addition of eight ounces of nitric acid, and continued the operation till the yellow colour, which had disappeared on the addition of the nitric acid, returned. The liquor in the retort contained a white powder, and when cold, was observed to be thick. Eight ounces of water were added to dilute this liquor, which was then filtrated, by which the white powder was separated; which being edulcorated and dried, weighed $7\frac{1}{2}$ drachms. The filtrated solution was evaporated to the consistence of a syrup, and again subjected to distillation, with four ounces of nitric acid as before; after which, the liquor, when cold, was observed to contain many small, oblong, sour crystals, together with some white powder. This powder being separated, the liquor was again distilled with more nitric acid, as before; by which means the liquor was rendered capable of yielding crystals again; and by one distillation more, with more nitrous acid, the whole of the liquor was converted into crystals. These crystals, added together, weighed five drachms; and were found, upon trial, to have the properties of the oxalic acid.

Mr. Scheele next examined the properties of the white powder, and found it to be an acid of a peculiar nature; he therefore called it the acid of sugar of milk. It was afterwards called saccholactic, and by corruption saclactic acid by the French chemists. Fourcroy has lately given it the name of mucous acid, because it is obtained by treating gum arabic, and other mucilaginous substances, with nitric acid.

Mr. Hermstadt, of Berlin, had made similar experiments on sugar of milk at the same time with Scheele, and with similar results: but he concluded that the white powder which he obtained was nothing else than oxalat of lime with excess of acid, as indeed Scheele himself did at first. After he became acquainted with Scheele's conclusions, he published a paper in defence of his own opinions; but his proofs are very far from establishing it, or even rendering its truth probable. He acknowledges himself, that he has not been able to decompose this supposed salt: he allows that it possesses properties distinct from the oxalic acid; but he ascribes this difference to the lime which it contains: yet all the lime which he could discover in 240 grains of this salt was only 20 grains; and if the alkali which he employed was a carbonat (as it probably was), these 20 must be reduced to 11. Now Morveau has shewn, that oxalic acid, containing the same quantity of lime, exhibits very different properties. Besides, this acid, whatever it is, when united with lime, is separated by the oxalic, and must therefore be different from it: as it would be absurd to suppose that an acid could displace itself. The saclactic acid has therefore been con-

sidered as a distinct acid, since it possesses peculiar properties.

1. Saccholactic acid may be obtained by the following process: Upon one part of gum arabic, or other similar gum, previously put into a retort, pour two parts of nitric acid. Apply a slight heat for a short time, till a little nitrous gass and carbonic acid gass comes over; then allow the mixture to cool. A white powder gradually precipitates, which may easily be separated by filtration. This powder is saccholactic acid.

2. Saccholactic acid, thus obtained, is under the form of a white gritty powder, with a slightly acid taste.

Heat decomposes it. When distilled, there comes over an acid liquor which crystallizes in needles on cooling, a red-coloured acrid oil, carbonic acid gass, and carbureted hydrogen gass. There remains in the retort a large proportion of charcoal.

Saccholactic acid, according to Scheele, is soluble in 60 parts of its weight of boiling water; but Messrs. Hermstadt and Morveau found, that boiling water only dissolved $\frac{1}{10}$th part: it deposited about $\frac{1}{4}$th part on cooling in the form of crystals.

The solution has an acid taste, and reddens the infusion of turnsole. Its specific gravity, at the temperature of 53.7°, is 1.0015. The compounds which it forms with earths, alkalies, and metallic oxyds, are denominated saccholats.

Since the observations of Scheele, Morveau, and Hermstadt, however, Tromsdorf has turned his attention to the constituent principles of saccholactic acid, and it has once more a chance of being struck out of the list of acids of a peculiar and distinctive character, for he seems to have ascertained it to be a mere succinic acid. See Annales de Chimie, lxxi. 79.

SACCHUS LACHRYMA'LIS. In anatomy. (*Saccus*). The lachrymal sac is situated in the internal canthus of the eye, behind the lachrymal caruncle, in a cavity formed by the os unguis. It receives the tears from the puncta lachrymalia, and conveys them into the ductus lachrymalis.

SACERDO'TAL. *a.* (*sacerdotalis*, Latin.) Priestly; belonging to the priesthood (*Atter.*).

SA'CHEL. *s.* (*sacculus*, Lat.) A small sack or bag.

SACHEVERELL (Henry), a divine of great notoriety. He was son of a poor clergyman at Marlborough, and was educated by his godfather, and placed at Magdalen college, Oxford. His regularity and polite manners rendered him a favourite tutor in the college, and his Latin poems, some of which appeared in the Musæ Anglicanæ, proved him an elegant scholar. He was at Oxford the contemporary of Addison, who inscribed his farewell poem to the muses to him, as his dearest friend. His first preferment was Cannock, Staffordshire, to which, in 1705, was added the preachership of St. Saviour's, Southwark. His two famous sermons were delivered at Derby, 14th August 1709, and at St. Paul's, Nov. 9th, before the lord mayor, and as in one of them he was supposed to allude, under the name of Volpone, to lord Godolphin, they drew upon him the resentment of parliament. His trial before the peers began 27th February 1709-10, and ended the 23d March; but though he was suspended for three years, and his sermons were burnt by the hands of the executioner, so violent was the party spirit of the times, that this completely overturned the ministry. The queen saw with pleasure the propagation of sentiments which enforced the divine rights of monarchs, and passive obedience, and when his punishment was expired, he was presented to the living of St. Andrew's, Holborn, and received with such enthusiasm, that of the first sermon which he preached, and which he sold for 100l. 40,000 copies were immediately bought. Thus, for a while regarded as the champion of the church, Sacheverell enjoyed popularity, till at last he sunk into obscurity. He died 1724, and by his will left 500l. to bishop Atterbury, who is supposed to have written his defence before the peers, and to have composed the elegant Latin inscription for the silver bason gilt, which he presented to his counsel sir Simon Harcourt. He is described by the duchess of Marlborough, who, no doubt, was displeased at his popularity, as an ignorant impudent incendiary, the scorn even of those who made use of him as a tool; and Burnet, with equal contempt, observes of him, that he possessed little of religion, virtue, learning, or good sense, but forced himself to preferment by railing at dissenters and low churchmen.

SACK. *s.* (שק, Hebrew; σάκκος; *saccus*, Lat. sæc, Saxon.) 1. A bag; a pouch; commonly a large bag (*Knolles*). 2. The measure of three bushels. 3. A woman's loose robe.

To SACK. *v. a.* (from the noun.) 1. To put in bags (*Betterton*). 2. (from *sacar*, Spanish.) To take by storm; to pillage; to plunder (*Sou.*).

SACK. *s.* (from the verb.) Storm of a town; pillage; plunder (*Dryden*).

SACK, a wine used by our ancestors, which some have taken to be Rhenish and some Canary wine. Venner, in his Via Recta ad Vitam Longam, printed in 1628, says that sack is "completely not in the third degree, and that some affect to drink sack with sugar and some without; and upon no other ground, as I think, but as it is best pleasing to their palate." He goes on to say, "that sack, taken by itself, is very hot and very penetrative; being taken with sugar, the heat is both somewhat allayed, and the penetrative quality thereof also retarded." He adds further, that Rhenish, &c. decline after a twelvemonth, but sack and the other stronger wines are best when they are two or three years old. It appears to be highly probable that sack was not a sweet wine, from its being taken with sugar, and that it did not receive its name from having a saccharine flavour, but from its being originally stored in sacks or borachios. It does not appear to have been a French wine, but a strong wine the production of a hot climate. Probably it was what is called dry mountain, or some

Spanish wine of that kind. This conjecture is the more plausible, as Howell, in his French and English Dictionary, printed in the year 1650, translates sack by the words *vin d'Espagne, vin sec.*

SACK OF WOOL, a quantity of wool containing just twenty-two stone, and every stone fourteen pounds. In Scotland, a sack is twenty-four stone, each stone containing sixteen pounds.

SACKS OF EARTH, in fortification, are canvas-bags filled with earth. They are used in making intrenchments in haste, to place on parapets, or the head of the breaches, &c. to repair them, when beaten down.

SACKBUT. See SACBUT.

SA'CKCLOTH. *s.* (*sack* and *cloth.*) Cloth of which sacks are made; coarse cloth sometimes worn in mortification (*Sandys*).

SA'CKER. *s.* (from *sack.*) One that takes a town.

SA'CKFUL. *s.* (*sack* and *full.*) A full bag.

SA'CKPOSSET. *s.* (*sack* and *posset.*) A posset made of milk, sack, and some other ingredients (*Swift*).

SACKVILLE (Thomas), first lord Buckhurst, was born at Buckhurst, Sussex, 1536. From Oxford he removed to Cambridge, and afterwards to the Inner Temple. He acquired celebrity by his Induction, or Introduction to the Myrror of Magistrates, a series of poems, and by his Gorboduc, a tragedy. When distinguished as a writer, he became a statesman, was made a peer, and served Elizabeth, to whom he was related by her mother's side, in various negociations. In 1590 he was knight of the garter, and the next year chancellor of Oxford, and in 1598 treasurer. Though one of the commissioners who tried Mary of Scots, he was noticed by James on his accession, and was created, 1604, earl of Dorset. He died suddenly, in consequence of a dropsy in the brain, 1608.

SACKVILLE (Edward), grandson of the above, was sent in 1620 to assist Frederic of Bohemia, and was at the battle of Prague, and in 1621 went as ambassador to the French court. After his brother's death, to whose title he succeeded 1624, he was made knight of the garter, president of the council, and lord privy seal. He died 1652, and was succeeded by his son Richard, who died 1677. There is in the 129th paper of the Guardian an account of a duel which he fought in Zealand with lord Bruce, in 1613, and in which he killed his antagonist.

SACKVILLE (Charles), earl of Dorset and Middlesex, descended from lord Buckhurst, was born 1637. After travelling through France and Italy, he returned a little before the restoration. He sat as member for East Grinstead; but he was too fond of gallantry to apply to political affairs. He served as volunteer in the Dutch war in 1665, under the duke of York, and the night previous to the engagement composed a celebrated song, still regarded as the best of his poetical pieces. He was afterwards employed in embassies by the king, and in 1674 succeeded to the estates of his uncle, earl of Middlesex, and to his father two years after. He warmly espoused the cause of the prince of Orange, and accompanied Anne in her flight to Northampton, and was made chamberlain of the household, a privy counsellor, and knight of the garter. He died at Bath 1705-6, and was succeeded by Lionel his son, who, in 1720, was raised to the dignity of a duke. Dorset was not only a poet, but also the friend of learned men, and he has been commended in the highest strains of panegyric by Dryden, Congreve, Addison, and especially by Prior, whose dedication of his work to his son is considered as a composition of superior merit. His poems are few, but possess great beauty.

SACKVILLE (George, viscount), third son of the first duke of Dorset, was born 1716. From Westminster school he went to Ireland, where his father was viceroy, and he received his education in Trinity college, Dublin. He was at the battles of Dettingen and Fontenoy, and distinguished himself under the duke of Cumberland against the Scotch rebels. In 1758 he went with Marlborough in the expedition against St. Malo's. At the battle of Minden, where he commanded the English and Hanoverian cavalry, his conduct was censured, because during the action he did not bring up his troops with celerity. Whether the delay originated in the orders or in the timidity of the general, is unknown; but a court martial dismissed him, though his name was struck off from the list of privy counsellors. In the next reign he was restored to the favor of his sovereign. In 1769 he assumed the name of Germaine, according to the will of lady Elizabeth Germaine, to whose property he succeeded, and the next year he fought a duel with governor Johnstone, who in the house of commons had reflected on his conduct with much asperity. He was in 1775 secretary of state for the colonial department, and first lord of the board of trade; but on the change of ministry, he resigned, and in 1782 was created a viscount. He died 1785.

SACRAMENT, (*sacramentum,*) in the general, denotes a sign of a holy or sacred thing.

The word is formed from the Latin *sacramentum*, which signified an oath, particularly that which the soldiers took, to be true to their commanders; the words whereof, according to Polybius, were *obtemperaturus sum & facturus quicquid mandabitur, ab imperatoribus juxta vires.*

In this sense, the word includes both the sacraments of the law of nature, as sound morality, the manner of offering the bread and wine practised by Melchisedek, &c. and those of the law of Moses, as the circumcision, the paschal lamb, purifications, order of priesthood, &c.

SACRAMENT, with regard to the Christian church, is frequently defined, an outward and visible sign of an inward and spiritual grace annexed to the use thereof.

But some have objected against this definition, as obscure; unless it supposes some divine influence of an extraordinary nature inseparably

annexed to the outward sign; and if this be the meaning of it, they apprehend there is reason to question whether there be any sacrament at all. Accordingly, they have chosen to define sacraments to be ordinances instituted by Christ, to be used by all Christians as seals of the covenant of grace; or as tokens of their accepting the gospel covenant as well as of the divine acceptance. Or, the term sacrament, originally signifying the oath which the Roman soldiers took to be faithful to their general (though it be no scripture term), is properly enough transferred to denote the affectionate zeal, and inviolable fidelity, which the followers of Jesus, in baptism and the Lord's supper, profess and promise to the captain of their salvation.

There are two objects in a sacrament; the one a material sign, the object of the senses; the other the thing signified, which is the object of faith. Thus it has pleased God to give as it were a body or substance to spiritual mysteries, that our faith might have the assistance of sensible signs.

The sacrament of the Lord's supper is the most solemn act of worship amongst us, and by the rubric there must be three at the least to communicate, and a minister is not without lawful cause to deny it to any who shall devoutly and humbly desire it; but notorious sinners are not to be admitted to it till they have repented; nor those who maliciously contend, until they are reconciled, &c. Also the sacrament is not to be administered to such who refuse to kneel, or to be present at the prayers of the church, or to strangers; for a minister is not obliged to give it to any but those of his own parish; and the partakers of the holy sacrament ought to signify their names to the curate at least a day before it is administered. Can. 27. If a minister refuses to give the sacrament to any one being required by the bishop, he is to certify the cause of such refusal; and a parson refusing to administer the sacrament to any, without just cause, is liable to be sued in action of the case; because a man may sustain a temporal loss by such refusal. By statute no person shall be chosen into any office of magistracy, or place of trust, &c. unless they receive the sacrament according to the rites of the church of England, and deliver a certificate thereof to the court of king's bench or quarter sessions, under the hand of the minister, and prove it by witnesses. 13, 14, and 25 Car. II. In every parish church the sacrament is to be administered three times in the year (whereof the feast of Easter to be one), and every layman is bound to receive it thrice every year, &c. In colleges, and the halls of the universities, the sacraments are to be administered the first and second Sunday of every month; and in cathedral churches upon all principal feast days. Canon 21, 22, 23. The churchwardens, as well as the minister, are to take notice whether the parishioners come so often to the sacrament as they ought; and on a churchwarden's presenting a man for not receiving the sacrament, he may be libelled in the ecclesiastical court and excommunicated, &c. Reviling the sacrament of the Lord's supper is punishable by fine and imprisonment. 1 Edw. vi. c. 1. 1 Eliz. c. 1.

Roman catholics own seven sacraments; viz. baptism, confirmation, the eucharist, penance, extreme unction, ordination, and marriage. See each under its proper article. See also POPERY.

The protestants admit of only two; viz. baptism and the eucharist, or Lord's supper.

The Romanists, however, call the eucharist, by way of eminence, the Holy Sacrament. Thus, to expose the holy sacrament, is to lay a consecrated host on the altar to be adored. The procession of the holy sacrament, is that wherein this host is carried about the church, or about the town.

In a like sense they say, the feast of the holy sacrament, the congregation of the holy sacrament.

SACRAMENT (Congregation of the holy), a religious establishment formed in France, whose founder was Autherius, bishop of Bethlehem, and which, in 1644, received an order from Urban VIII. to have always a number of ecclesiastics ready to exercise their ministry among pagan nations, wherever the pope, or congregation de propaganda, should appoint.

SACRAMENT (St.), a town of Paraguay, settled by the Portuguese, and taken in 1777 by the Spaniards, to whom it was ceded by treaty. It stands on the river Plata, nearly opposite Buenos Ayres, 100 miles W. by N. of Monte Video.

SACRAME'NTAL. *a.* (*sacramental*, Fr. from *sacrament*.) Constituting a sacrament; pertaining to a sacrament (*Taylor*).

SACRAME'NTALLY. *ad.* After the manner of a sacrament (*Hammond*.)

SACRE, in ornithology. See FALCO.

SA'CRED. *a.* (*sacré*, French; *sacer*, Lat.) 1. Immediately relating to God (*Arbuthnot*). 2. Devoted to religious uses; holy (*Milton*). 3. Dedicated; consecrate; consecrated (*Dryden*). 4. Relating to religion; theological (*Milton*). 5. Entitled to reverence (*Cowley*). 6. Inviolable (*Dryden*).

SA'CREDLY. *ad.* (from *sacred*.) Inviolably; religiously (*South*).

SA'CREDNESS. *s.* (from *sacred*.) The state of being sacred; state of being consecrated to religious uses; holiness; sanctity (*L'Estr.*).

SACRI'FIC. *a.* (*sacrificus*, Lat.) Employed in sacrifice.

SACRI'FICABLE. *a.* (from *sacrificor*, Latin.) Capable of being offered in sacrifice (*Brown*).

SACRIFICA'TOR. *s.* (from *sacrificor*, Lat.) Sacrificer; offerer of sacrifice (*Brown*).

SACRI'FICATORY. *a.* (from *sacrificor*, Lat.) Offering sacrifice.

To SA'CRIFICE. *v. a.* (*sacrifico*, Lat.) 1. To offer to heaven; to immolate as an atonement or propitiation (*Milton*). 2. To destroy or give up for the sake of something else (*Broome*). 3. To destroy; to kill. 4. To devote with loss (*Prior*).

To SA'CRIFICE. *v. n.* To make offerings; to offer sacrifice (*Milton*).

SA'CRIFICE. *s.* (*sacrificium*, Latin.) 1. The act of offering to heaven (*Milton*). 2. The thing offered to heaven, or immolated by an act of religion (*Milton*). 3. Any thing destroyed, or quitted for the sake of something else. 4. Any thing destroyed.

SACRIFICE, an offering made to God on an altar, by means of a regular minister, as an acknowledgment of his power, and a payment of homage. Sacrifices (though the term is sometimes used to comprehend all the offerings made to God, or in any way devoted to his service and honour) differ from mere oblations in this, that in a sacrifice there is a real destruction or change of the thing offered; whereas an oblation is only a simple offering or gift, without any such change at all: thus, all sorts of tythes, and first fruits, and whatever of men's worldly substance is consecrated to God, for the support of his worship and the maintenance of his ministers, are offerings or oblations: and these, under the Jewish law, were either of living creatures or other things: but sacrifices, in the more peculiar sense of the term, were either wholly or in part consumed by fire. They have by divines been divided into bloody and unbloody. Bloody sacrifices were made of living creatures; unbloody of the fruits of the earth. They have also been divided into *expiatory*, *impetratory*, and *eucharistical*. The first kind were offered to obtain of God forgiveness of sins; the second, to procure some favour; and the third, to express thankfulness for favours already received. Under one or other of these heads may all sacrifices be arranged; though we are told, that the Egyptians had 666 different kinds, a number surpassing all credibility.

Concerning the origin of sacrifices very various opinions have been held. By many, the Phœnicians are supposed to have been the authors of them; though Porphyry attributes their invention to the Egyptians; and Ovid imagines, from the import of the name *victim* and *hostia*, that no bloody sacrifices were offered till wars prevailed in the world, and nations obtained victories over their enemies. These are mere hypotheses, contradicted by the most authentic records of antiquity, and entitled to no regard.

By modern deists, sacrifices are said to have had their origin in superstition, which operates much in the same way in every country. It is therefore weak, according to those men, to derive this practice from any particular people; since the same mode of reasoning would lead various nations, without any intercourse with each other, to entertain the same opinions respecting the nature of their gods, and the proper means of appeasing their anger. Men of gross conceptions imagine their deities to be like themselves, covetous and cruel. They are accustomed to appease an injured neighbour by a composition in money; and they endeavoured to compound in the same manner with their gods, by rich offerings to their temples and to their priests. The most valuable property of a simple people is their cattle. These offered in sacrifice are supposed to be fed upon by the divinity, and are actually fed upon by his priests. If a crime is committed which requires the punishment of death, it is accounted perfectly fair to appease the deity by offering one life for another; because, by savages, punishment is considered as a debt for which a man may compound in the best way that he can, and which one man may pay for another. Hence, it is said, arose the absurd notions of imputed guilt, and vicarious atonement. Among the Egyptians, a white bull was chosen as an expiatory sacrifice to their god Apis. After being killed at the altar his head was cut off, and cast into the river, with the following execration: "May all the evils impending over those who perform this sacrifice, or over the Egyptians in general, be averted on this head!"

Had sacrifice never prevailed in the world but among such gross idolaters as worshipped departed heroes, who were supposed to retain in their state of deification all the passions and appetites of their mortal state, this account of the origin of that mode of worship would have been to us perfectly satisfactory. We readily admit, that such mean notions of their gods may have actually led far distant tribes, who could not derive any thing from each other through the channel of tradition, to imagine that beings of human passions and appetites might be appeased or bribed by costly offerings. But we know from the most incontrovertible authority, that sacrifices of the three kinds that we have mentioned were in use among people who worshipped the true God, and who must have had very correct notions of his attributes. Now we think it impossible that such notions could have led any man to fancy that the taking away of the life of a harmless animal, or the burning of a cake or other fruits of the earth in the fire, would be acceptable to a Being self-existent, omnipotent, and omniscient, who can neither be injured by the crimes of his creatures, nor receive any accession of happiness from a thousand worlds.

Sensible of the force of such reasoning as this, some persons of great name, who admit the authenticity of the Jewish and Christian sacrifices, and firmly rely on the atonement made by Christ, are yet unwilling (it is difficult to conceive for what reason) to allow that sacrifices were originally instituted by God. Of this way of thinking were St. Chrysostom, Spencer, Grotius, and Warburton, as were likewise the Jews Maimonides, R. Levi, Ben Gerson, and Abarbanel. The greater part of these writers maintain, that sacrifices were at first a human institution; and that God, in order to prevent their being offered to idols, introduced them into his service, though he did not approve of them as good in themselves, or as proper rites of worship. That the infinitely wise and good God should introduce into his service improper rites of worship, appears to us so extremely improbable, that we cannot but wonder how such an opinion should have ever found its way into the minds of such men as those who held it. Warburton's theory of sacrifices is much more plausible, and, being more lately published, is worthy of particular examination.

According to this ingenious prelate, sacrifices had their origin in the sentiments of the human heart, and in the ancient mode of conversing by action in aid of words. Gratitude to God for benefits received is natural to the mind of man, as well as his bounden duty. "This duty (says the bishop) was in the most early times discharged in expressive actions, the least equivocal of which was the offerer's bringing the first fruits of pasturage or agriculture to that sequestered place where the Deity used to be more solemnly invoked, at the stated times of public worship; and there presenting them in homage, with a demand which spoke to this purpose—'I do hereby acknowledge thee, O my God! to be the author and giver of all good: and do now, with humble gratitude return

my warmest thanks for these thy blessings particularly bestowed upon me.'"—Things thus devoted became thenceforth sacred: and to prevent their *desecration*, the readiest way was to send them to the table of the priest, or to consume them in the fire of the altar. Such, in the opinion of our author, was the origin of eucharistical sacrifices. *Impetratory* or *precative* sacrifices had, he thinks, the same origin, and were contrived to express by action an invocation for the continuance of God's favour. "Expiatory sacrifices (says the learned prelate) were in their own nature as intelligible, and in practice as rational, as either of the other two. Here, instead of presenting the first fruits of agriculture and pasturage, in corn, wine, oil, and wool, as in the eucharistical, or a portion of what was to be sown or otherwise propagated, as in the *impetratory*; some chosen animal, precious to the repenting criminal who deprecates, or supposed to be obnoxious to the Deity who is to be appeased, was offered up and slain at the altar, in an action which, in all languages, when translated into words, speaks to this purpose:—'I confess my transgressions at thy footstool, O my God! and with the deepest contrition implore thy pardon; confessing that I deserve death for those my offences.'—The latter part of the confession was more forcibly expressed by the action of striking the devoted animal, and depriving it of life; which, when put into words, concluded in this manner—'And I own that I myself deserve the death which I now inflict on this animal.'"

This system of sacrifice, which his lordship thinks so well supported by the most early movements of simple nature, we admit to be ingenious, but by no means satisfactory. That mankind in the earlier ages of the world were accustomed to supply the deficiencies of their language by expressive gesticulations we are not inclined to controvert: the custom prevails among savage nations, or nations half civilized, at the present day. His lordship, however, is of opinion, and we heartily agree with him, that our first parents were instructed by God to make articulate sounds significant of ideas, notions, and things (see LANGUAGE), and not left to fabricate a language for themselves. That this heaven-taught language could be at first copious, no man will suppose who thinks of the paucity of ideas which those who spoke it had to express; but when we consider its origin, we cannot entertain a doubt but that it was precise and perspicuous, and admirably adapted to all the real purposes of life. Among these purposes must surely be included the worship of God as the most important of all. Every sentiment therefore which enters into worship, gratitude, invocation, confession, and deprecation, the progenitors of mankind were undoubtedly taught to clothe in words the most significant and unequivocal; but we know from Moses, whose divine legation the bishop surely admitted, that Cain and Abel, the eldest children of our first parents, worshipped God by the rites of sacrifice: and can we suppose that this practice occurred to them from their having so far forgotten the language taught them by their father, as to be under the necessity of denoting by action what they could not express by words? If this supposition be admitted, it will force another upon us still more extravagant. Even Adam himself must, in that case, have become dumb in consequence of his fall; for it is not conceivable, that as long as he was able to utter articulate sounds, and affix a meaning to them, he would cease, in the presence of his family, to confess his sins, implore forgiveness, and express his gratitude to God for all his mercies.

The right reverend writer, as if aware of some such objection as this to his theory, contends, that "if sacrifices had arisen from any other source than the light of reason, the Scripture would not have been silent concerning that source; especially since we find Moses carefully recording what God immediately, and not nature, taught to Adam and his family. Had the original of sacrifice, says he, been prescribed, and directly commanded by the Deity, the sacred historian could never have omitted the express mention of that circumstance. The two capital observances in the Jewish ritual were the sabbath and sacrifices. To impress the highest reverence and veneration on the sabbath, he is careful to record its divine original: and can we suppose that, had sacrifices had the same original, he would have neglected to establish this truth at the time that he recorded the other, since it is of equal use and of equal importance? I should have said, indeed, of much greater; for the multifarious sacrifices of the law had not only a reference to the forfeiture of Adam, but likewise prefigured our redemption by Jesus Christ."

But all this reasoning was foreseen, and completely answered before his lordship gave it to the public. It is probable, that though the distinction of weeks was well known over all the eastern world, the Hebrews, during their residence in Egypt, were very negligent in their observance of the Sabbath. To enforce a religious observance of that sacred day, it became necessary to inform them of the time and occasion of its first institution, that they might keep it holy in memory of the creation; but, in a country like Egypt, the people were in danger of holding sacrifices rather in too high than too low veneration, so that there was not the same necessity for mentioning explicitly the early institution of them. It was sufficient that they knew the divine institution of their own sacrifices, and the purposes for which they were offered. Besides this, there is reason to believe, that in order to guard the Hebrews from the infections of the heathen, the rite of sacrificing was loaded with many additional ceremonies at its second institution under Moses. It might, therefore, be improper to relate its original simplicity to a rebellious people, who would think themselves ill-used by any additional burdens of trouble or expense, however really necessary to their happiness. Bishop Warburton sees clearly the necessity of concealing from the Jews the spiritual and refined nature of the Christian dispensation, lest such a backsliding people should, from the contemplation of it, have held in contempt their own economy. This, he thinks, is the reason why the prophets, speaking of the reign of the Messiah, borrow their images from the Mosaic dispensation, that the people living under that dispensation might not despise it from perceiving its end; and we think the reason will hold equally good for their law-giver concealing from them the simplicity of the first sacrifices, lest they should be tempted to murmur at their own multifarious ritual.

But his lordship thinks that sacrifices had their origin from the light of natural reason. We should be glad to know what light natural reason can throw upon such a subject. That ignorant pagans, adoring as gods departed heroes, who still retained their sensual appetites, might naturally think of appeasing such beings with the fat of

ted beasts, and the perfumes of the altar, we have already admitted; but that Cain and Abel, who knew that the God whom they adored has neither body, parts, nor passions; that he created and sustains the universe; and that from his very nature he must will the happiness of all his creatures, should be led by the light of natural reason to think of appeasing him, or obtaining favours from him, by putting to death harmless animals, is a position which no arguments of his lordship can ever compel us to admit. That Abel's sacrifice was indeed accepted, we know; but it was not accepted because it proceeded from the movements of the human mind, and the deficiency of the original language, but because it was offered through faith. The light of natural reason, however, doth not generate faith, but science; and when it fails of that, its offspring is absurdity. "Faith is the substance of things hoped for, the evidence of things not seen," and comes not by reasoning but by hearing. What things then were they of which Abel had heard, for which he hoped, and in the faith of which he offered sacrifice? Undoubtedly it was a restoration to that immortality which was forfeited by the transgression of his parents. Of such redemption an obscure intimation had been given to Adam, in the promise that the seed of the woman should bruise the head of the serpent; and it was doubtless to impress upon his mind in more striking colours the manner in which this was to be done, that bloody sacrifices were first instituted. (See PROPHECY.) As long as the import of such rites was thus understood, they constituted a perfectly rational worship, as they showed the people that the wages of sin is death; but when men sunk into idolatry, and lost all hopes of a resurrection from the dead, the slaughtering of animals to appease their deities was a practice grossly superstitious. It rested in itself without pointing to any further end, and the grovelling worshippers believed that by their sacrifices they purchased the favour of their deities. When once this notion was entertained, human sacrifices were soon introduced; for it naturally occurred to those who offered them, that what they most valued themselves would be most acceptable to their offended gods, (see the next article.) By the Jewish law, these abominable offerings were strictly forbidden, and the whole ritual of sacrifice restored to its original purity, though not simplicity.

All Christian churches, the Socinian, if it can be called a church, not excepted, have till very lately agreed in believing that the Jewish sacrifices served, amongst other uses, for types of the death of Christ and the Christian worship, (see TYPE.) In this belief all sober Christians agree still, whilst many are of opinion that they were likewise fœderal rites, as they certainly were considered by the ancient Romans.

Of the various kinds of Jewish sacrifices, and the subordinate ends for which they were offered, a full account is given in the books of Moses. When an Israelite offered a loaf or a cake, the priest broke it in two parts; and, setting aside that half which he reserved for himself, broke the other into crumbs, poured oil, wine, incense, and salt upon it, and spread the whole upon the fire of the altar. If these offerings were accompanied with the sacrifice of an animal, they were thrown upon the victim, to be consumed along with it. If the offerings were of the ears of new corn, they were parched at the fire, rubbed in the hand, and then offered to the priest in a vessel, over which he poured oil, incense, wine, and salt, and then burnt it upon the altar, having first taken as much of it as of right belonged to himself.

The principal sacrifices among the Hebrews consisted of bullocks, sheep, and goats; but doves and turtles were accepted from those who were not able to bring the other: these beasts were to be perfect, and without blemish. The rites of sacrificing were various; all of which are very minutely described in the books of Moses.

The manner of sacrificing among the Greeks and Romans was as follows. In the choice of the victim, they took care that it was without blemish or imperfection; its tail was not to be too small at the end; the tongue not black, nor the ears cleft; and that the bull was one that had never been yoked. The victim being pitched upon, they gilt the forehead and horns, especially if a bull, heifer, or cow. The head they also adorned with a garland of flowers, a woollen infula or holy fillet, whence hung two rows of chaplets with twisted ribbands; and on the middle of the body a kind of stole, pretty large, hung down on each side: the lesser victims were only adorned with garlands and bundles of flowers, together with white tufts or wreaths.

The victims thus prepared were brought before the altar; the lesser being driven to the place, and the greater led by a halter; when, if they made any struggle, or refused to go, the resistance was taken for an ill omen, and the sacrifice frequently set aside. The victim thus brought was carefully examined, to see that there was no defect in it; then the priest, clad in his sacerdotal habit, and accompanied with the sacrificers and other attendants, and being washed and purified according to the ceremonies prescribed, turned to the right hand, and went round the altar, sprinkling it with meal and holy water, and also besprinkling those who were present. Then the crier proclaimed with a loud voice, Who is here? To which the people replied, Many and good. The priest then, having exhorted the people to join with him, by saying Let us pray, confessed his own unworthiness, acknowledging that he had been guilty of divers sins; for which he begged pardon of the gods, hoping that they would be pleased to grant his requests, accept the oblations offered them, and send them all health and happiness; and to this general form added petitions for such particular favours as were then desired. Prayers being ended, the priest took a cup of wine, and, having tasted it himself, caused his assistants to do the like; and then poured forth the remainder between the horns of the victim. Then the priest or the crier, or sometimes the most honourable person in the company, killed the beast, by knocking it down or cutting its throat. If the sacrifice was in honour of the celestial gods, the throat was turned up towards heaven; but if they sacrificed to the heroes or infernal gods, the victim was killed with its throat towards the ground. If by accident the beast escaped the stroke, leaped up after it, or expired with pain and difficulty, it was thought to be unacceptable to the gods. The beast being killed, the priest inspected its entrails, and made predictions from them. They then poured wine, together with frankincense, into the fire, to increase the flame, and then laid the sacrifice on the altar; which in the primitive times was burnt whole to the gods, and thence called a holocaust; but in after-times, only part of the victim was consumed in the fire, and the remainder reserved for the sacrificers; the thighs, and sometimes the entrails, being burnt to their honour, the company

feasted upon the rest. During the sacrifice, the priest, and the person who gave the sacrifice, jointly prayed, laying their hand upon the altar. Sometimes they played upon musical instruments in the time of the sacrifice, and on some occasions they danced round the altar singing sacred hymns in honour of the god.

SACRIFICES (Human), an abominable practice, about the origin of which different opinions have been formed.—The true account seems to be that which we have given in the preceding article. When men had gone so far as to indulge the fancy of bribing their gods by sacrifice, it was natural for them to think of enhancing the value of so cheap an atonement by the cost and rarity of the offering; and, oppressed with their malady, they never rested till they had got to that which they conceived to be the most precious of all, a human sacrifice. "It was customary (says Sanchoniathon), in ancient times, in great and public calamities, before things became incurable, for princes and magistrates to offer up in sacrifice to the avenging dæmons the dearest of their offspring." Sanchoniathon wrote of Phœnicia, but the practice prevailed in every nation under heaven of which we have received any ancient account. The Egyptians had it in the early part of their monarchy. The Cretans likewise had it, and retained it for a longer time. The nations of Arabia did the same. The people of Dumah, in particular, sacrificed every year a child, and buried it underneath an altar, which they made use of instead of an idol; for they did not admit of images. The Persians buried people alive. Amestris, the wife of Xerxes, entombed 12 persons quick under ground for the good of her soul. It would be endless to enumerate every city, or every province, where these dire practices obtained. The Cyprians, the Rhodians, the Phoceans, the Ionians, those of Chios, Lesbos, Tenedos, all had human sacrifices. The natives of the Tauric Chersonesus offered up to Diana every stranger whom chance threw upon their coast. Hence arose that just expostulation in Euripides upon the inconsistency of the proceeding; wherein much good reasoning is implied. Iphigenia wonders, as the goddess delighted in the blood of men, that every villain and murderer should be privileged to escape, nay, driven from the threshold of the temple: whereas, if an honest and virtuous man chanced to stray thither, he was only seized upon, and put to death. The Pelasgi, in a time of scarcity, vowed the tenth of all that should be born to them for a sacrifice, in order to procure plenty. Aristomenes the Messenian slew 300 noble Lacedemonians, among whom was Theopompus the king of Sparta, at the altar of Jupiter at Ithome. Without doubt the Lacedemonians did not fail to make ample returns; for they were a severe and revengeful people, and offered the like victims to Mars. Their festival of the Diamastigosis is well known; when the Spartan boys where whipped in the sight of their parents with such severity before the altar of Diana Orthia, that they often expired under the torture. Phylarchus affirms, as he is quoted by Porphyry, that of old every Grecian state made it a rule, before they marched towards an enemy, to solicit a blessing on their undertakings by human victims.

The Romans were accustomed to the like sacrifices. They both devoted themselves to the infernal gods, and constrained others to submit to the same horrid doom. Hence we read in Titus Livius, that, in the consulate of Æmilius Paulus and Terentius Varro, two Gauls, a man and a woman, and two in like manner of Greece, were buried alive at Rome in the ox-market, where was a place under ground, walled round, to receive them; which had before been made use of for such cruel purposes. He says it was a sacrifice not properly Roman, that is, not originally of Roman institution; yet it was frequently practised there, and that too by public authority. Plutarch makes mention of a like instance a few years before, in the consulship of Flaminius and Furius. There is reason to think, that all the principal captives who graced the triumphs of the Romans, were at the close of that cruel pageantry put to death at the altar of Jupiter Capitolinus. Caius Marius offered up his own daughter for a victim to the Dii Averrunci, to procure success in a battle against the Cimbri; as we are informed by Dorotheus, quoted by Clemens. It is likewise attested by Plutarch, who says that her name was Calpurnia. Marius was a man of a sour and bloody disposition; and had probably heard of such sacrifices being offered in the enemy's camp, among whom they were very common, or he might have beheld them exhibited at a distance; and therefore murdered what was nearest, and should have been dearest to him, to counteract their fearful spells, and outwit them in their wicked machinery. Cicero, making mention of this custom being common in Gaul, adds, that it prevailed among the people even at the time he was speaking; from whence we may be led to infer, that it was then discontinued among the Romans. And we are told by Pliny, that it had then, and not very long, discouraged. For there was a law enacted, when Lentulus and Crassus were consuls, so late as the 657th year of Rome, that there should be no more human sacrifices: for till that time those horrid rites had been celebrated in broad day without any mask or controul; which, had we not the best evidence for the fact, would appear scarce credible. And however they may have been discontinued for a time, we find that they were again renewed; though they became not so public, nor so general. For, not very long after this, it is reported of Augustus Cæsar, when Perusia surrendered in the time of the second triumvirate, that besides multitudes executed in a military manner, he offered up, upon the Ides of March, 300 chosen persons, both of the equestrian and senatorial order, at an altar dedicated to the manes of his uncle Julius. Even at Rome itself this custom was revived: and Porphyry assures us, that in his time a man was every year sacrificed at the shrine of Jupiter Latialis. Heliogabalus offered the like victims to the Syrian deity which he introduced among the Romans. The same is said of Aurelian.

The Greeks, we find, called the deity to whom human offerings were made Agraulos; and feigned that she was a woman, and the daughter of Cecrops. But how came Cecrops to have any connection with Cyprus? Agraulos is a corruption and transposition of the original name, which should have been rendered *Uk El Aur* or *Uk El Aurus*; but has, like many other oriental titles and names, been strangely sophisticated, and is here changed to Agraulos. It was in reality the god of light, who was always worshipped with fire. This deity was the Moloch of the Tyrians and Canaanites, and the Melech of the east; that is, the great and principal god, the god of light, of whom fire was esteemed a symbol; and at whose shrine, instead of viler victims, they offered the blood of men.

Such was the Kronus of the Greeks, and the Moloch of the Phœnicians: and nothing can appear more shocking than the sacrifices of the Tyrians and Carthaginians, which they performed to this idol. In all emergencies of state, and times of general calamity, they devoted what was most necessary and valuable to them for an offering to the gods, and particularly to Moloch. But besides these undetermined times of bloodshed, they had particular and prescribed seasons every year, when children were chosen out of the most noble and reputable families, as before mentioned. If a person had an only child, it was the more liable to be put to death, as being esteemed more acceptable to the deity, and more efficacious for the general good. Those who were sacrificed to Kronus were thrown into the arms of a molten idol, which stood in the midst of a large fire, and was red with heat. The arms of it were stretched out, with the hands turned upwards, as it were to receive them; yet sloping downwards, so that they dropt from thence into a glowing furnace below. To other gods they were otherwise slaughtered, and, as it is implied, by the very hands of their parents. What can be more horrid to the imagination, than to suppose a father leading the dearest of all his sons to such an infernal shrine? or a mother the most engaging and affectionate of her daughters, just rising to maturity, to be slaughtered at the altar of Ashtaroth or Baal? Justin describes this unnatural custom very pathetically: *Quippe homines, ut victimas, immolabant: et impuberes (quæ ætas hostium misericordiam provocat) aris admovebant; pacem sanguine eorum exposcentes, pro quorum vita Dii rogari maxime solent.* Such was their blind zeal, that this was continually practised; and so much of natural affection still left unextinguished, as to render the scene ten times more shocking from the tenderness which they seemed to express. They embraced their children with great fondness, and encouraged them in the gentlest terms, that they might not be appalled at the sight of the hellish process; begging of them to submit with cheerfulness to this fearful operation. If there was any appearance of a tear rising, or a cry unawares escaping, the mother smothered it with her kisses, that there might not be any show of backwardness or constraint, but the whole be a free-will offering. These cruel endearments over, they stabbed them to the heart, or otherwise opened the sluices of life; and with the blood warm, as it ran, besmeared the altar and the grim visage of the idol. These were the customs which the Israelites learned of the people of Canaan, and for which they are upbraided by the psalmist: "They did not destroy the nations, concerning whom the Lord commanded them; but were mingled among the heathen, and learned their works: yea, they sacrificed their sons and their daughters unto devils, and shed innocent blood, even the blood of their sons and of their daughters, whom they sacrificed unto the idols of Canaan; and the land was polluted with blood. Thus were they defiled with their own works, and went a whoring with their own inventions."

These cruel rites, practised in so many nations, made Plutarch debate with himself, "Whether it would not have been better for the Galatæ, or for the Scythians, to have had no tradition or conception of any superior beings, than to have formed to themselves notions of gods who delighted in the blood of men; of gods, who esteemed human victims the most acceptable and perfect sacrifice? Would it not (says he) have been more eligible for the Carthaginians to have had the atheist Critias, or Diagoras, their lawgiver, at the commencement of their polity, and to have been taught that there was neither god nor dæmon, than to have sacrificed, in the manner they were wont, to the god which they adored? Wherein they acted, not as the person did whom Empedocles describes in some poetry, where he exposes this unnatural custom. The sire there with many idle vows offers up unwittingly his son for a sacrifice; but the youth was so changed in feature and figure, that his father did not know him. These people used, knowingly and wilfully, to go through this bloody work, and slaughter their own offspring. Even they who were childless would not be exempted from this cursed tribute; but purchased children, at a price, of the poorer sort, and put them to death with as little remorse as one would kill a lamb or a chicken. The mother, who sacrificed her child, stood by, without any seeming sense of what she was losing, and without uttering a groan. If a sigh did by chance escape, she lost all the honour which she proposed to herself in the offering, and the child was notwithstanding slain. All the time of this ceremony, while the children were murdering, there was a noise of clarions and tabors sounding before the idol, that the cries and shrieks of the victims might not be heard. "Tell me now (says Plutarch), if the monsters of old, the Typhons, and the giants, were to expel the gods, and to rule the world in their stead; could they require a service more horrid than these infernal rites and sacrifices?"

SA'CRIFICER. *s.* (from *sacrifice*.) One who offers sacrifice; one that immolates (*Addison*).

SACRIFI'CIAL. *a.* (from *sacrifice*.) Performing sacrifice; included in sacrifice (*Taylor*).

SACRILEGE, SACRILEGIUM, the crime of profaning sacred things, or things devoted to God; or of alienating to laymen, or common purposes, what was given to religious persons and pious uses.

SACRILE'GIOUS. *a.* (*sacrilegus*, Latin.) Violating things sacred; polluted with the crime of sacrilege (*Pope*).

SACRILE'GIOUSLY. *ad.* With sacrilege.

SA'CRING. *part.* Consecrating (*Shaks.*).

SA'CRIST. SA'CRISTAN. *s.* (*sacristain*, French.) He that has the care of the utensils or moveables of the church (*Ayliffe*).

SA'CRISTY. *s.* (*sacristie*, French.) An apartment where the consecrated vessels or moveables of a church are reposited (*Addison*).

SACROBOSCO. See HOLYWOOD.

SACRO-LUMBA'LIS. In myology, a long muscle, thicker and broader below than above, and extending from the os sacrum to the lower part of the neck, under the serrati postici, rhomboideus, trapezius, and latissimus dorsi. It arises in common with the longissimus dorsi, tendinous without, and fleshy within, from the posterior part of the os sacrum; from the posterior edge of the spine of the ilium; from all the spinous processes, and from near the roots of the transverse processes of the lumbar vertebræ. At the bottom of the back it separates from the longissimus dorsi, with which it had before formed, as it were,

only one muscle, and ascending obliquely outwards, gradually diminishes in thickness, and terminates above in a very narrow point. From the place where it quits the longissimus dorsi, to that of its termination, we find it fleshy at its posterior, and tendinous at its anterior edge. This tendinous side sends off as many long and thin tendons as there are ribs. The lowermost of these tendons are broader, thicker, and shorter than those above; they are inserted into the inferior edge of each rib, where it begins to be curved forwards towards the sternum, excepting only the uppermost and last tendon, which ends in the posterior and inferior part of the transverse process of the last vertebra of the neck. From the upper part of the five, six, seven, eight, nine, ten, or eleven lower ribs, (for the number, though most commonly seven or eight, varies in different subjects), arise as many thin bundles of fleshy fibres, which after a very short progress, terminate in the inner side of this muscle, and have been named by Steno *musculi ad sacro lumbalem accessorii*. Besides these, we find the muscle sending off a fleshy slip from its upper part, which is inserted into the posterior and inferior part of the transverse processes of the five inferior vertebræ of the neck, by as many distinct tendons. This is generally described as a distinct muscle. Diemerbroeck, and Douglas and Albinus after him, call it *cervicalis descendens*. Winslow names it *tranversalis collateralis colli*. Morgagni considers it as an appendage to the sacro lumbalis. The uses of this muscle are to assist in erecting the trunk of the body, in turning it upon its axis or to one side, and in drawing the ribs downwards. By means of its upper slip, it serves to turn the neck obliquely backwards, or to one side.

SACRUM. (*sacrum*, so called from *sacer*, sacred.) Os sacrum. Os basilare. In anatomy. The os sacrum derives its name from its being offered in sacrifice by the ancients, or perhaps from its supporting the organs of generation, which they considered as sacred. In young subjects it is composed of five or six pieces united by cartilage; but in more advanced age it becomes one bone, in which, however, we may still easily distinguish the marks of the former separation. Its shape has sometimes been compared to an irregular triangle; and sometimes, and perhaps more properly, to a pyramid, flattened before and behind, with its basis placed towards the lumbar vertebræ, and its point terminating in the coccyx. We find it convex behind, and slightly concave before, with its inferior portion bent a little forwards. Its anterior surface is smooth, and affords four, and sometimes five transverse lines, of a colour different from the rest of the bone. These are the remains of the intermediate cartilages by which its several pieces were united in infancy. Its posterior convex surface has several prominences, the most remarkable of which are its spinous processes; these are usually three in number, and gradually become shorter, so that the third is not so long as the second, nor the second as the first. This arrangement enables us to sit with ease. Its transverse processes are formed into one oblong process, which becomes gradually smaller as it descends. At the superior part of the bone we observe two oblique processes, of a cylindrical shape, and somewhat concave, which are articulated with the last of the lumbar vertebræ. At the base of each of these oblique processes is a notch, which, with such another in the vertebræ above it, form a passage for the twenty-fourth spinal nerve. In viewing this bone, either before or behind, we observe four, and sometimes five holes on each side, situate at each extremity of the transverse lines we described as marking the divisions of the bone. Of these holes, the anterior ones, and of these again, the uppermost, are the largest, and afford a passage to the nerves. The posterior holes are smaller, covered with membranes, and destined for the same purpose as the former. Sometimes at the bottom of the bone there is only a notch, and sometimes there is a hole common to it and the os coccygis. The cavity between the body of this bone and its processes, for the lodgment of the spinal marrow, is triangular, and becomes smaller as it descends, till at length it terminates obliquely on each side at the lower part of the bone. Below the third division of the bone, however, the cavity is no longer completely bony, as in the rest of the spine, but is defended posteriorly only by a very strong membrane; hence a wound in this part may be attended with the most dangerous consequences. This bone is articulated above, with the last lumbar vertebræ: laterally, it is firmly united, by a broad irregular surface, to the ossa innominata, or hip-bone: and below it is joined to the os coccygis. In women the os sacrum is usually shorter, broader, and more curved, than in men, by which means the cavity of the pelvis is more enlarged.

SACRUM BELLUM, a name given to the wars carried on concerning the temple of Delphi. The first began B. C. 448, and in it the Athenians and Lacedæmonians were auxiliaries on opposite sides. The second war began 357 B. C. and finished nine years after by Philip of Macedonia, who destroyed all the cities of the Phocians. See PHOCIS.

SAD. *a.* (the etymology not known.) 1. Sorrowful; full of grief (*Milton*). 2. Habitually melancholy; heavy; gloomy; not gay; not cheerful (*Pope*). 3. Serious; not light; not volatile; grave (*Herbert*). 4. Afflictive; calamitous (*Milton*). 5. Bad; inconvenient; vexatious (*Addison*). 6. Dark-coloured (*Walton*). 7. Heavy; weighty; ponderous (*Spenser*). 8. Cohesive; not light; firm; close (*Mortimer*).

To SA'DDEN. *v. a.* (from *sad.*) 1. To make sad; to make sorrowful. 2. To make melancholy; to make gloomy (*Pope*). 3. To make dark coloured. 4. To make heavy; to make cohesive (*Mortimer*).

SADDLE, a stuffed seat, laid on the back of a horse, for the convenience and security of

the rider. There are several sorts of saddles in use, but they are too well known to require a particular description.

Mr. John Lawrence justly observes, that "the English saddle is highly improved within the last twenty or thirty years; not only in respect of symmetry, fitness, and beauty, but of ease, both to the rider and the horse. But nothing has contributed so much, in the modern saddle, to the ease and convenience of the rider, as the forward projection of the pads, where the knees rest, and the situation of the skirts, or flaps, above and below the knee. It is true, the knees are apt to be galled in a long journey, by the stirrup leathers, which are now placed without the long flap; but they may be occasionally drawn beneath it. The saddle is secured by two girths only, and those placed exactly one over the other, appearing as if single. The circingle is out of fashionable use, except upon the turf, and saddle-cloths are, at present, laid aside. As for the crupper, nothing is deemed more unsportsman-like and awkward; and whether from prejudice or not, I cannot help conceiting it always detracts from the figure of the horse. Where a horse has a good shoulder, and the saddle fits him, a crupper is totally unnecessary; but I cannot commend the taste or prudence of those who, to avoid the unfashionable appearance of a crupper, will submit to the risk of riding upon their horse's neck, or the trouble of dismounting every four miles, to replace their saddle. When it is absolutely necessary to submit to be cruppered, observe that the strap be very broad and soft, that it may not chafe the horse's rump; and that a candle be sewed up within that part which goes beneath the tail. For horses that are in danger of slipping through their girths, it is necessary to provide a breast-plate, which is fastened to the saddle."

To SA'DDLE. *v. a.* (from the noun.) 1. To cover with a saddle (*Prior*). 2. To load; to burden (*Dryden*).

SADDLEBACK, a mountain in Cumberland, so called from its form, situate five miles E.N.E. of Keswick. It is 2787 feet above the level of the sea, according to the measurement of colonel Mudge; and on one side is an immense cavity, once the crater of a volcano, at the bottom of which is a lake about 20 acres in dimension.

SADDLE-BACKED, among horsemen, a name given to a horse that is hard to fit with a saddle, his reins being low, and his head and neck raised, so as to require a saddle to be made on purpose for him.

SADDLE-GALLED, is when a horse's back is hurt or fretted with the saddle. See the articles GALLING and BACK, &c.

SA'DDLE-MAKER. SA'DDLER. *s.* (from *saddle.*) One whose trade is to make saddles (*Digby*).

SADDUCEES, in Jewish antiquity, a famous sect among the ancient Jews, so called from their founder Sadoc Antigonus of Socho, president of the Sanhedrim at Jerusalem, and teacher of the law in the principal divinity-school of that city. Having often in his lectures asserted to his scholars, that they ought not to serve God in a servile manner, with respect to reward, but only out of filial love and fear; two of his scholars, Sadoc and Batthus, inferred from thence, that there were no rewards or punishments after this life; and therefore, separating from the school of their master, they taught that there was no resurrection, nor future state. Many embracing this opinion, gave rise to the sect of the Sadducees, who were a kind of Epicureans, but differing from them in this, that though they denied a future state, yet they allowed the world was created by the power of God, and governed by his providence; whereas the followers of Epicurus denied both. The Sadducees denied all manner of predestination whatever, and not only rejected all unwritten traditions, but also all the books of the Old Testament, excepting the Pentateuch.

SA'DLY. *ad.* (from *sad.*) 1. Sorrowfully; mournfully (*Dryden*). 2. Calamitously; miserably (*South*).

SA'DNESS. *s.* (from *sad.*) 1. Sorrowfulness; mournfulness; dejection of mind (*Dryden*). 2. Melancholy look (*Milton*). 3. Seriousness; sedate gravity (*Dryden*).

SAFE. *a.* (*sauf*, French; *salvus*, Latin.) 1. Free from danger (*Dryden*). 2. Free from hurt (*L'Estrange*). 3. Conferring security (*Milton*). 4. No longer dangerous; reposited out of the power of doing harm (*Shakspeare*).

SAFE. *s.* (from the adjective.) A buttery; a small wired pantry (*Ainsworth*).

SA'FECONDUCT. *s.* (*safeconduit*, Fr.) 1. Convoy; guard through an enemy's country. 2. Pass; warrant to pass (*Clarendon*).

SA'FEGUARD. *s.* (*safe* and *guard.*) 1. Defence; protection; security (*Atterbury*). 2. Convoy; guard through any interdicted road, granted by the possessor. 3. Pass; warrant to pass (*Clarendon*).

To SA'FEGUARD. *v. a.* (from the noun.) To guard; to protect (*Shaskpeare*).

SA'FELY. *ad.* (from *safe.*) 1. In a safe manner; without danger (*Locke*). 2. Without hurt (*Shakspeare*).

SA'FENESS. *s.* (from *safe.*) Exemption from danger (*South*).

SA'FETY. *s.* (from *safe.*) 1. Freedom from danger (*Shakspeare*). 2. Exemption from hurt (*Prior*). 3. Preservation from hurt (*Shakspeare*). 4. Custody; security from escape (*Shakspeare*).

SAFFI, a strong seaport of Morocco, with a castle. It was long the centre of the commerce carried on with Europe, but now has little trade. It is 16 miles S. of Cape Cantin. Lon. 8. 58 W. Lat. 32. 28 N.

SAFFLOWER, a name given by colour-preparers to one or two species of the carthamus or bastard saffron, and especially C. tinctorius, and C. lanatus; both of which are cultivated in Spain and the Levant, and the latter of which is indigenous to the south of Europe, from whence it is imported into our

own country. The dyeing material contains two colouring substances, a yellow and a red. Of these the former alone is soluble in water, and is comparatively of little value; the latter is soluble in alkalies, and, being precipitated from them by several acids, forms a beautiful rose-red pigment; which is sometimes used for silk-dyeing, but by far the greater consumption of which takes place in the preparation of *rouge*, so celebrated as a cosmetic, of which, indeed, it forms the most essential ingredient.

To prepare the carthamus for this purpose it is necessary first to extract the yellow portion; which is done by tying the plant in a linen bag, and then washing it incessantly with water, using much squeezing and rinsing, till the water passes off colourless. The residue in the linen-bag now consists of the fibrous part of the plant, and of the valuable red fecula, which last however is in very small quantity. This is extracted by digesting the washed carthamus in a solution of carbonat of soda (without applying artificial heat, which would impair the colour); and an orange-yellow alkaline solution is now obtained, which, on saturation with acids, turns red, and gradually deposits a beautiful red fecula, which is the pigment in question. Lemon juice is the acid preferred. But as the colour of this red fecula is extremely intense, it will bear dilutions, which is done chiefly by rubbing it with finely powdered talc in different proportions.

Alkohol will also dissolve the red part of safflower; and after the yellow portion has been extracted by water, a fine red tincture is made by digesting the residue in alkohol. On account of the high price of this plant, it is seldom if ever employed except for giving a finishing gloss to dyed silks, and in the preparation of rouge. Alkalies of every kind immediately alter the colour to an orange-yellow, again restored by acids.

SAFFRON, in botany. See CROCUS.

SAFFRON (Meadow). See COLCHICUM.

SA'FFRON. *a.* Yellow; having the colour of saffron (*Chapman*).

To SAG. *v. n.* To hang heavy (*Shakspeare*).

To SAG. *v. a.* To load; to burden.

SAGA'CIOUS. *a.* (*sagax*, Latin.) 1. Quick of scent (*Dryden*). 2. Quick of thought; acute in making discoveries (*Locke*).

SAGA'CIOUSLY. *ad.* 1. With quick scent. 2. With acuteness of penetration.

SAGA'CIOUSNESS. *s.* (from *sagacious*.) The quality of being sagacious.

SAGA'CITY. *s.* (*sagacitas*, Latin.) 1. Quickness of scent. 2. Acuteness of discovery (*Locke*).

SAGAPENUM. (*sagapenum*, σαγαπηνον. The name is derived from some eastern dialect.) Serapinum. It is conjectured that this concrete gummi-resinous juice is the production of an oriental umbelliferous plant. Sagapenum is brought from Persia and Alexandria in large masses, externally yellowish, internally pale, and of an horny clearness. Its taste is hot and biting, its smell of the alliaceous and fetid kind, and its virtues are similar to those which have been ascribed to assafœtida, but weaker, and consequently it is less powerful in its effects.

SAGAN, a town of Silesia, capital of a principality of the same name. It has double walls, a fine palace, a priory of the Augustine order, a Lutheran school, and good cloth manufactures. It is seated on the Bober, 80 miles N. W. of Breslau. Lon. 15. 22 E. Lat. 51. 42 N.

SAGE, in botany. See SALVIA.

SAGE (Indian wild). See LANTANA.

SAGE OF JERUSALEM. See PHLOMIS.

SAGE TREE. See PHLOMIS.

SAGE WOOD. See TEUCRIUM.

SAGE (Alain René le), was born at Ruys, in Brittanny, 1667. His compositions display not only judgment, but elegance and neatness. Though indebted for the plan of his romances to Spanish writers, yet he possessed peculiar merits of his own. His works are Gil Blas—the Diable Boiteaux—besides the Bachelier de Salamanque—the new Don Quixote, and other theatrical pieces, and the Letters of Aristenætus from the Greek. His Gil Blas is, and ever will be, a popular performance, and must be read, because, as Voltaire has observed, he has imitated nature. He died near Paris, 1747.

SAGE. *a.* (*sage*, French; *saggio*, Italian.) Wise; grave; prudent (*Waller*).

SAGE. *s.* (from the adjective.) A philosopher; a man of gravity and wisdom (*Pope*).

SA'GELY. *ad.* (from *sage*.) Wisely; prudently.

SA'GENESS. *s.* (from *sage*.) Gravity; prudence.

SAGG HARBOUR, a seaport of New York, in Suffolk county, at the east end of Long Island. The whale fishery from this place produces 1000 barrels of oil annually. It is 12 miles N. W. of Southampton, and 87 E. of New York.

SAGINA. Pearl-wort. In botany, a genus of the class tetrandia, order tetragynia. Calyx four-leaved; petals four; capsule four-celled, many-seeded. Five species; one a native of Virginia; the rest indigenous to our own country, and found on walls or sandy shores.

SAGITTA, in astronomy, the arrow, or dart, a constellation of the northern hemisphere, near the eagle, consisting of five stars, according to Ptolemy and Tycho; but in Mr. Flamsteed's catalogue, of no less than twenty-three.

SAGITTA, in geometry, a term used for the abscis of a curve.

SAGITTA, in trigonometry, the same with the versed sine of an arch.

SAGITTAL SUTURE. (*sutura sagittalis*, from *sagitta*, an arrow.) The suture which unites the two parietal bones. It has been named sagittal, from its lying between the coronal and lamdoidal sutures, as an arrow betwixt the string and the bow.

SAGITTARIA. Arrow-head. In botany, a genus of the class monoecia, order polyandria. Calyx three-leaved; petals three. Male: filaments about twenty-four, collected in a head. Fem.: pistils numerous; capsules numerous, swelling, one-seeded. Five species; chiefly natives of the East and West Indies; one, S. sagittifolia, with arrow-shaped, acute leaves, indigenous to the marshes and moist wastes of our own country. The root is composed of various strong fibres, which strike into the mud; the foot-stalks of the leaves depend upon the depth of the superincumbent water, so that they are sometimes three or four feet long, thick and fungous. At the lower part of the root is a bulb growing into the solid earth, beneath the mud, which in China forms a part of the food of the poor, who cultivate the plant on this account. Horses, goats, and swine eat it; cows reject it.

SAGGITTARIUS, the archer, in astronomy, the ninth sign of the zodiac. The stars in this constellation in Ptolemy's catalogue are thirty-two, in Tycho's sixteen, and in Mr. Flamsteed's fifty-two. Among which there are no stars of either the first or the second magnitude, and only four of the third.

SAGITTATE LEAF. (from *sagitta*, an arrow.) Shaped like the head of an arrow. Triangulare, basi excavatum, angulis posticis instructum. Philos. Bot. Triangulare, angulis posticis acutis sinu divisis.—Triangular, hollowed at the base, with angles at the hinder part—or, with the hinder angles acute divided by a sinus.—As in convolvulus arvensis and sepium. Sagittaria. Rumex acetosa, or common sorrel. Erica vulgaris, or common heath.

SAGO. Sagus. Sagu. A dry fecula, obtained from the pith of a species of palm, the cycas circualis of Linnéus, in the islands of Java, Molucca, and the Philippines. But the best is the production of the ARECA OLERACEA, which see. Sago becomes transparent by boiling in water, and forms a light and agreeable liquid, much recommended in febrile, phthisical and calculous disorders, &c.

SAGRA. In the entomology of Fabricius, a tribe of the coleopterous genus TENEBRIO, which see.

SAGREZ, a strong town of Portugal, in Algarva, with a harbour and a fort, four miles west of Cape St. Vincent, and 125 south of Lisbon. Lon. 9. 4 W. Lat. 37. 4 N.

SAGUE. See SAGO.

SAGUM, in Roman antiquity, a military habit, open from top to bottom, and usually fastened on the right shoulder with a buckle or clasp. It was not different in shape from the chlamys of the Greeks and the paludamentum of the generals. The only difference between them was, that the paludamentum was made of a richer stuff, was generally of a purple colour, and both longer and fuller than the sagum.

SAGUNTUM, or SAGUNTUS, now Morvedro, a town of Hispania Tarraconensis, at the west of the Iberus, about a mile from the sea. Saguntum is celebrated as being the cause of the second Punic war, and for its attachment to the Romans. Hannibal took it after a siege of about eight months; and the inhabitants, not to fall into the enemy's hands, burnt themselves with their houses, and all their effects. The conqueror afterwards rebuilt it, and, as some suppose, called it Spartagene.

SAGUR, a town of Hindustan Proper, in the province of Malwa, situate near the Bunnass river, 87 miles N.W. of Gurrah, and 112 S. of Agra. Lon. 78. 53 E. Lat. 23. 45 N.

SAHAGUN, a town of Spain, in Leon, with a rich abbey; seated in a fertile plain, on the river Sea, 17 miles from Placentia. Lon. 5. 23 W. Lat. 42. 33 N.

SAHLITE, in mineralogy, a species of the talc genus, of a light greenish-grey colour; it occurs massive; externally it is shining and splendent; its principal fracture is foliated; fragments frequently rhomboidal; consists of very coarse granular distinct concretions: it is translucent on the edge; semihard, brittle, and easily frangible; specific gravity 3.21. It is found at Sahla in Sweden, whence M. Werner has given it the name above. It is the malacolite of Haüy. See ACTINOTUS VULGARIS, and VITREUS. It is fusible before the blowpipe, though with difficulty, into a porous glass. Independently of the silver mines of Sahla, it has also been found at Busen, near Anen in Norway.

SA'IC. *s.* (*saica*, Italian.) A Turkish vessel proper for the carriage of merchandise.

SAID. The pret. and pass. of *say*. 1. Aforesaid (*Hale*). 2. Declared; showed.

SAID, a town of Upper Egypt, seated on the Nile, 150 miles S. of Cairo. Lon. 31. 20 E. Lat. 27. 32 N.

SAID, in Palestine. See SIDON.

SAIL. *s.* (ſeɣl, Saxon; *seyhel, seyl*, Dutch.) 1. The expanded sheet, which catches the wind, and carries on the vessel on the water. 2. (In poetry.) Wings (*Spenser*). 3. A ship; a vessel (*Addison*). 4. *Sail* is a collective word, noting the number of ships: as, *twenty sail;* a fleet of twenty ships (*Raleigh*). 5. *To strike* SAIL. To lower the sail (*Acts*). 6. A proverbial phrase for abating of pomp or superiority (*Shakspeare*).

To SAIL. *v. n.* (from the noun.) 1. To be moved by the wind with sails (*More*). 2. To pass by sea (*Acts*). 3. To swim (*Dryden*). 4. To pass smoothly along (*Shakspeare*).

To SAIL. *v. a.* 1. To pass by means of sails (*Dryden*). 2. To fly through (*Pope*).

SAIL, in navigation, an assemblage of several breadths of canvas, sewed together by the lists, and edged round with a cord, fastened to the yards of a ship, to make it drive before the wind. Every yard in a ship has its proper sail, except the cross-jack, which takes it name from the yard; and those which are not bent to the yard, are the flying jib, fore, foretop, main, maintop, maintop-gallant, mizen, mizentop-mast, stay-sails, main and maintop studding sails. See SHIP-BUILDING.

SA'ILER. SA'ILOR. *s.* (from *sail.*) A

seaman; one who practises or understands navigation (*Arbuthnot. Pope*).

SAILING, properly denotes the art of navigating and working a ship, or of causing her to observe such motions and directions as are assigned by the navigator; in which sense sailing differs from navigation, and must be learned by practice on shipboard. See NAVIGATION.

All the different methods of sailing may be divided into four, viz. close-hauled, large, quartering, and afore the wind; all which relate to the direction of the wind with regard to the ship's course, and the arrangement of the sails.

SAILING also implies a particular mode of navigation, formed on the principles and regulated by the laws of trigonometry. Hence we say, plain sailing, Mercator's, middle latitude, parallel, and great circle sailing. See the article NAVIGATION.

SA'ILYARD. *s.* (*sail* and *yard.*) The pole on which the sail is extended (*Dryden*).

SAIM. *s.* (*saime*, Italian.) Lard.

SAIN. (a participle, obsolete, from *say.*) Said (*Shakspeare*).

SA'INFOIN. See HEDYSARUM.

SAINT. *s.* (*saint*, French.) A person eminent for piety and virtue (*Shakspeare*).

To SAINT. *v. a.* (from the noun.) To number among saints; to reckon among saints by a public decree; to canonize (*Addison*).

To SAINT. *v. n.* To act with a show of piety.

SAINTS, (*sancti,*) in the Romish church, holy persons deceased, and, since their decease, canonized by the pope, after several informations and ceremonies.

One of the points wherein the Roman catholics and protestants differ, is, that the former address, invoke, and supplicate saints, &c. to intercede for them; whereas the latter hold it sufficient to propose their good examples for our imitation.

Cardinal Bellarmine, and other popish writers, have pleaded, that by praying to the saints, they only intend to express a desire of their intercession, and that their invocation of the saints terminates ultimately in God. Accordingly they have distinguished two sorts of worship, one called *latria*, appropriate to God, and another *dulia*, which, being of an inferior nature, is paid to angels and saints. However, many of their own writers have exploded this distinction, and others have owned that it is unscriptural. There is another sort of worship, which is of a higher degree than that paid to saints in common, and which is peculiar to the Virgin Mary: this they call *hyperdulia.*

After all, those who read their books of devotion, their hours, their offices, their rosaries, their breviaries, and their missals, will find many direct addresses to the saints, which are very different from those prayers whose object is merely to supplicate their intercession. Besides, the council of Trent, sess. 25. directs to apply to the saints for their help and assistance, as well as their prayers; and condemns all who think, that it is not good and profitable to offer prayers to saints, as chargeable with impious sentiments. And the creed of pope Pius IV. expressly insists upon it as an article of faith, that the saints reigning together with Christ are to be invocated. As to the antiquity of this practice, the council of Trent, sess. 25. speaks of it as the usage of the apostolic and catholic church from the beginning of Christianity. As to the doctrine of the intercession of saints and angels, there is not the least intimation of it in the writings of the two first centuries; though it must be allowed to have been introduced in the next century, and that Origen and Cyprian expressly favour this superstition. The worship of saints and angels is of a much later date; especially as a standing generally received doctrine of the church. For though Athanasius was for worshipping the saints, yet Cyril, who lived in the next century, says, we neither call the holy martyrs gods, nor are we used to worship them. St. Austin affirms, that neither saints nor angels will be worshipped. Archbishop Usher says, that as to the first four hundred years after Christ, for nine parts of that time, not one true testimony can be produced out of any father in favour of this doctrine; and cardinal Perron, Richlieu, and other learned writers among the Romanists own, that the invocation of saints was not practised for the three first centuries. The first symptoms of this worship did not appear till towards the end of the fourth century, and it seems to have sprung out of the regard which the Christians at that time manifested to the memory of the martyrs. They frequented their tombs, and erected altars there, praying to God, and engaging themselves to a strict imitation of the virtues and piety of the departed martyrs; by degrees this veneration degenerated into praises and eulogiums of the saints themselves, in which they used some apostrophes and rhetorical addresses; whence proceeded a superstitious regard to them, and, at length, a direct invocation and worship of them. Nor does it appear, that any public prayers to saints were established till A. D. 788, by the second council of Nice; and this council was condemned by another held at Francfort, A. D. 794; and the invocation of saints was likewise condemned by a former council held at Constantinople, A. D. 755, consisting of three hundred and eighty-eight bishops. In the seventh century, Gregory expressly says, that angels refused to be worshipped since the appearance of Christ.

In order to convey some idea of the extravagance to which veneration for reputed saints hath arrived in the Romish church, we shall only mention one instance out of many that might be alleged. It is well known that there were three altars in the cathedral church of Canterbury, one erected to the honour of Christ, another to the Virgin Mary, and a third to St. Thomas à Becket; and the offerings at his shrine amounted to about 1000*l.* when those to the Virgin did not amount to

5*l.* and those to Christ were nothing; and Rapin informs us, that in one year, viz. A. D. 1420, there were no less than fifty thousand foreigners who came in pilgrimages to pay their homage at this tomb.

The number of saints, allowed as such, in the Romish church, is prodigious. Father Papebroche reckons seventeen or eighteen hundred to have died on the first of June, only. Indeed the crowd of saints, wherewith their martyrologies are stocked, is scandalous, even to the more sober of their own communion. Father Mabillon, in an express dissertation on the worship of unknown saints, observes, that honours are given to saints, who, perhaps, were not Christians, and whose very names were never known. Hence, being under a necessity of giving them names, they are therefore called baptised saints. He adds, that they every day beseech saints to intercede for them with God, when it is much doubted whether they themselves be in heaven.

Father Papebroche and his associates have been a long time employed in writing the lives and acts of the saints; they range them each on the day of the year wherein they died: for the first six months they have published twenty-four volumes in folio; and since Papebroche's death, in 1714, his successors have published more.

SAINT ANDREW'S CROSS, in botany. See ASCYRUM.

SAINT BARNABY'S THISTLE, in botany. See CENTAUREA.

SAINT BRUNO'S LILY, in botany. See ANTHERICUM.

SAINTFOIN, in botany. See HEDYSARUM.

SAINT JOHN'S BREAD, in botany. See CERATONIA

SAINT JOHN'S WORT, in botany. See HYPERICUM.

SAINT PETER'S WORT, in botany. See ASCYRUM.

SAINT PETER'S WORT (Shrubby), in botany. See LONICERA.

SAINT IGNATIUS'S BEAN, in botany. See FABA INDICA.

SAINT JAMES's WORT. The common ragwort is sometimes so called. See JACOBÆA.

SAINT ANTONY'S FIRE. See ERYSIPELAS.

SAINT VITUS'S DANCE. See CHOREA SANCTI VITI.

SAINT-JOHN (Henry, viscount Bolingbroke), a great politician, born 1672, at Battersea. He was educated at Eton and Christchurch, Oxford, and though his earlier years were disgraced by an immoderate love of pleasure, he laid the foundation of that eminence which afterwards distinguished him as an orator, and as a statesman. He married the daughter of sir Henry Winchcombe, and obtained a seat in parliament for Wotton-Basset, 1700. In 1704 he was made secretary at war, but resigned when his friend Harley was dismissed from the seals in 1707. Three years after he again shared the honours of Harley, and became secretary of state; but the part which he supported in framing the peace of Utrecht has exposed him to much censure. In 1712 he was created lord St. John, viscount Bolingbroke, and made lord lieutenant of Essex; but dissatisfied because he was not raised to the rank of an earl, he meditated a separation from Harley, and in the attempt he ruined his own fortunes, and those of his former associate. On the accession of George I. in 1714, the seals were taken from him, though he had shewn himself a friend to the Hanoverian succession. Finding it dangerous to continue in the country, he retired to France, 1715, but resolutely rejected the overtures made to him by the pretender. The persecution, however, of his enemies at home changed his sentiments, and he accepted at last the office of secretary of state to the pretender, and prepared for the invasion of England. This was no sooner known than he was impeached by Walpole; but while disgraced at home, his new master accused him of treachery, incapacity, and neglect. By means of lord Stair, ambassador in France, he obtained a promise of pardon from the king, 1716, which was fully granted in 1723, and restored to his country, he settled near Uxbridge, and devoted himself to literary and rural employments, and to the conversation of Swift, Pope, and other learned friends. But still excluded from a seat in the house of lords, he vented his disappointment against Walpole, and attacked his measures in the Craftsman, and in some pamphlets. For ten years he showed his opposition to the minister, and then laid aside his pen, and retired in 1735 to France. He afterwards returned and settled at Battersea, where the last part of his life was spent in the *otium cum dignitate*. He died there 1751, on the verge of 80. His manuscripts were left to Mallet, who published them with the rest of his works, in 5 vols. 4to. 1754. His works may be divided into political and philosophical, the former consisting of letters upon history; letter to Wyndham, on patriotism; papers in the Craftsman, published separately, in 3 vols. 8vo; and the latter, substance of letters written to de Pouilly; letter on one of Tillotson's sermons; letters and essays, addressed to Pope. As a writer Bolingbroke was nervous, elegant, and argumentative, and in him were united, as a panegyrist has observed, the wisdom of Socrates, the dignity and ease of Pliny, and the wit of Horace. It is, however, to be lamented, that in his writings he often disregards or ridicules the great truths of revelation, and of christianity. As the friend of poets and of wits, he has acquired reputation; and Pope, who esteemed him to adoration, has immortalized himself and his friend, in the Essay on Man, which he began and finished by his persuasion. He married, in 1716, for his second wife, a niece of madame de Maintenon, widow of Villette; but as he died without issue, his titles were inherited by his nephew.

SAINT-JUST (Louis Leon de), was born at Blerancourt, near Noyon, 1768. He obtained

a seat in the national convention, and gained the friendship of Robespierre. His easy eloquence, his bold effrontery, and unappalled conduct, rendered him a fit partner for all the atrocities of that dreadful period, and by his influence the property of the emigrants was exposed to sale, the Girondists were conducted to the scaffold, and the effects of foreigners confiscated. The reign of Louis XVI. was described by this artful orator as a scene of tyranny; while the government of Robespierre exhibited nothing but benevolence. After he had insulted the feelings of human nature, interpreted pity into crimes, and condemned to death those who presumed to weep for the loss of their friends, this worthless tyrant was conducted to the scaffold with Robespierre, in 1794, and suffered death with more courage than could have been expected from him. He wrote Esprit de la Revolution, &c. 8vo. 1791.

SA'INTED. *a.* (from *saint.*) 1. Holy; pious; virtuous (*Shakspeare*). 2. Holy; sacred (*Milton*).

SAINTES, three of the Leeward Caribbee Islands in the W. Indies, between Guadaloupe and Dominica.

SAINTES, a town of France, in the department of Lower Charente, with a bishop's see. There are several monuments of antiquity, of which the most famous are the amphitheatre, the aqueducts, and the triumphal arch on the bridge over the Charente. The castle, built on a rock, is deemed impregnable; and the cathedral has one of the largest steeples in France. It is seated on an eminence, 37 miles S.E. of Rochelle, and 262 S.S.W. of Paris. Lon. 0. 38 W. Lat. 45. 54 N.

SA'INTLIKE. *a.* (*saint* and *like.*) 1. Suiting a saint; becoming a saint (*Dryden*). 2. Resembling a saint (*Bacon*).

SA'INTLY. *ad.* (from *saint.*) Like a saint; becoming a saint (*Milton*).

SAINTONGE, a late province of France, 62 miles long and 30 broad; bounded on the E. by Angoumois and Perigord, on the N. by Poitou and Aunis, on the W. by the Atlantic, and on the S. by Bordelois and Giron. The river Charente runs through the middle of it, and renders it one of the finest and most fertile provinces in France, abounding in all sorts of corn and fruits; and the best salt in Europe is made here. It now forms, with the late province of Aunis, the department of Lower Charente.

SA'INTSHIP. *s.* (from *saint.*) The character or qualities of a saint (*Pope*).

SAIS, a town in the Delta of Egypt, situate between the Canopic and Sebennytican mouths of the Nile, and anciently the capital of Lower Egypt. There was there a celebrated temple dedicated to Minerva, with a room cut out of one stone, conveyed by water from Elephantis by the labours of 2000 men in three years. This stone measured on the outside 21 cubits long, 14 broad, and eight high. Osiris was buried near Sais.

SAKE. *s.* (rac, Saxon; *saecke*, Dutch.) 1. Final cause; end; purpose (*Tillotson*). 2. Account; regard to any person or thing (*Sh.*).

SA'KER. *s.* (*Saker* originally signifies a hawk.) A sort of cannon (*Derham*).

SA'KERET. *s.* (from *saker.*) The male of a saker-hawk.

SAL ABSYNTHII. Salt of wormwood. This salt is precisely the same as all the carbonats of potash. See KALI PREPARATUM and POTASSA.

SAL ACETOCELLÆ. The salt of wood sorrel, usually vended for salt of lemons, is an acidulated oxylat of potash, and called in the new chemical nomenclature oxylas potassæ acidulus.

SAL ALKALINUS FIXUS. See ALKALI, FIXED.

SAL ALKALINUS VOLATILIS. See AMMONIAC.

SAL AMMONIAC. A saline concrete formed by the combination of the muriatic acid with ammoniac. This salt is found in places adjacent to volcanoes. It appears in the form of an efflorescence, or groups of needles, separate or compacted together, generally of a yellow or red colour, and mixed with arsenic and orpiment; but no use is made of that which is procured in this way. The sal ammoniac employed in the arts is prepared by a process we shall soon describe. The real origin of this factitious salt was unknown, till the beginning of the present century, though it had been made use of, in many of the arts, from time immemorial. M. Lemere, consul at Cairo, in a letter to the royal academy of Paris, dated 24th June 1719, first informed us how sal ammoniac is obtained from the soot of camels dung, which is burnt at Cairo instead of wood. This soot is put into large round bottles, a foot and a half in diameter, and terminating in a neck two inches long. The bottles are filled up with this matter to within four inches of the neck. Each bottle holds about forty pounds of soot, and affords nearly six pounds of salt. The vessels are put into a furnace in the form of an oven, so that only the necks appear above. A fire of camel's dung is kindled beneath it, and continued for three days and three nights. On the second and the third day the salt is sublimated. The bottles are then broken, and the salt is taken out in cakes. These cakes, which are sent us just as they have been taken out of the bottles in Egypt, are convex, and unequal on the one side; on the middle of this side they exhibit each a tubercle, corresponding to the neck of the bottle in which it was prepared. The lower side is concave, and both are sooty. Pomet makes mention of a sal ammoniac procured by the way of Holland, in truncated cakes resembling sugar-loaves. Geoffroy, who was the first in France who discovered from what materials this salt is obtained, and who even guessed successfully at the process employed at Cairo for preparing it, found out that this second species of sal ammoniac comes from the Indies, where it is prepared in much greater quantities than in Egypt, by the same process of sublimation, but in a different

form. These Indian loaves consist of fourteen or fifteen pounds each, are hollow at the bottom, and formed of various layers. The cone is truncated, because its extremity being impure is always broken off. M. Baumé has established, in the neighbourhood of Paris, a manufactory of ammoniacal salt, in which this salt is composed, not extracted as in Egypt. M. Baumé's salt is likewise purer than the Egyptian. In our own country sal ammoniac is likewise prepared in great quantities. The volatile alkali is obtained from soot, bones, and other substances known to contain it. To this the vitriolic acid is added, and this vitriolic ammoniac is decomposed by common salt by a double affinity. The liquor obtained in consequence of this decomposition contains sulphat of soda and sal ammoniac. The first is crystallized, and the second sublimated so as to form cakes, which are then exposed to sale. Lord Dundonald, by an ingenious process, extracted ammoniac from pit-coal. Ammoniacal muriat has a poignant, acrid, and urinous taste. Its crystals are in the form of long hexahædral pyramids, a number of them are sometimes united together in an acute angular direction, so as to exhibit the form of feathers. M. Rome de Lille thinks the crystals of ammoniacal muriat to be octahedrons bundled together. This salt is sometimes, but not frequently, found in cubic crystals in the middle of the concave hollow part of the sublimated cakes. This salt possesses one pretty singular physical property, a kind of ductility or elasticity, which causes it to yield under the hammer, or even the fingers, and makes it difficult to reduce it to a powder. Ammoniacal muriat is totally volatile, but a very strong fire is requisite to sublime it. This method is applied when it is wanted very pure, and entirely free of water; it is reduced to powder, put into a matras, and the vessel is then immersed half way into a sand bath, where it is gradually heated for several hours. By this means we obtain a mass consisting of striated needles, joined to each other longitudinally; when this operation is properly conducted, very regular cubic crystals are often found in the midst of the loaves. But if too strong a heat has been applied, the produce is only a shapeless, thick, and semi-transparent mass, with the appearance of having been melted. M. Baumé has observed, that by repeating sublimation of this salt, a small quantity both of ammoniac and muriatic acid is at length disengaged, so that according to that chemist ammoniacal muriat might perhaps be decomposed by continued sublimation. This fact requires confirmation. Ammoniacal muriat is liable to no alteration from air; it may be kept for a long time without suffering any change; it dissolves very readily in water. Six parts of cold water are sufficient to dissolve one of the salt. A considerable cold is produced as the solution takes place, and this cold is still keener when the salt is mixed with ice. This artificial cold is happily applied to produce several phænomena which could not otherwise take place, such as the congelation of water on certain occasions, the crystallization of certain salts, the fixation and preservation of certain liquids, naturally very subject to evaporation, &c. See MURIA.

Though the origin of this salt, which is a direct muriat of ammonia, has not been known till what are comparatively modern times, we know from Pliny that it was imported into Europe from Egypt as early as his era, and it seems to have existed immemorially in India. Besides being found native in the neighbourhood of Vesuvius, Etna, the Lipari Islands, Hecla, and other volcanic mountains, it has also been traced in the waters of various lakes in Tuscany, in the isle of Bourbon, and several other parts of Asia.

Upon chemical analysis it is found to be composed of

Muriat of ammonia - -	97,50
Sulphat of ammonia - -	2,50
	100,00.

And in preparing it artificially the following is a table of the proportions of dry carbonat of ammonia afforded by different substances.

Horn - - - -	1-5
Feathers - - - -	2-11
Wool - - - -	1-8
Soot - - - -	1-15
Bones - - - -	1-16
Blood - - - -	1-17
Putrid urine - - -	1-46.

In common manufactories the dry carbonat yields rather less than two thirds of sal ammoniac. In most of the Scotch manufactories soot is used instead of bones, these latter being only to be procured abundantly in the vicinity of large towns.

Muriat of ammonia, by whatever method procured, possesses the following properties. It has no smell. To the taste it is bitter, pungent and urinous, and at the same time cooling. Its colour when impure is yellowish or reddish; when thoroughly pure blueish-white; its texture when sublimed is fibrous; it is tough, moderately elastic, and somewhat ductile, and hence is not very easily reducible to powder. Its primitive crystalline form is the regular octahedron; but when crystallized from its solution in water it is either in long tetrahedral pyramids or in flaky feathered crystals: when sublimed it sometimes forms rhomboids, approaching very nearly to the cube; the former crystals are in some degree deliquescent, but the latter, as well as every other sublimed variety of this salt, is permanent in the air. Specific gravity 1·42.

When exposed to a dry heat somewhat exceeding that at which lead melts, it begins to rise in the form of a white vapour (without previously entering into fusion) which has a peculiar odour, and attaches itself to cool surfaces. It is generally represented as undergoing no change by this process, but according to Beaumé, after repeated sublimations it begins to be decomposed, a little ammonia

being first discharged, and afterwards some muriatic acid gass. It is soluble in thrice its weight of water at the ordinary temperature, and produces much cold during the solution: boiling water takes up its own weight of this salt, part of which, as the solution cools, is deposited in beautiful feathery crystals.

It is decomposable with abstraction of its acid, by the caustic fixed alkalies, and by all the alkaline earths, more especially if a moderate heat be applied. The ammonia is volatilized in the form of gass, and the acid remains behind in combination with the added alkali. If a carbonated instead of a pure alkali be employed, and sublimation is had recourse to, the ammonia rises in a mild or carbonated state.

Many of the metals and metallic oxyds are also capable of decomposing muriat of ammonia in the dry way, ammoniacal gass being disengaged, and the metal remaining behind in the state of muriat. It is a remarkable circumstance that many metals when thus treated are converted into muriated oxyds, although liquid muriatic acid has no effect upon them; thus mercury, when triturated accurately with sal ammoniac and heated, disengages ammoniacal gass, and muriated mercury is the result. If, however, an excess of ammoniacal muriat be present, this excess combines with the muriat of mercury, forming what has been called by the alchemists sal-alembroth. Silver, by a similar treatment, decomposes sal ammoniac, and is itself converted into luna cornea. Sulphuric acid is capable of decomposing sal ammoniac by distillation, the muriatic acid being volatilized, and sulphat of ammonia remaining in the retort. Nitric acid and sal ammoniac re-act upon each other: the muriatic acid being liberated from its base by part of the nitric acid, while another portion of the same is decomposed, and its oxygen passes to the muriatic acid, thus converting it into the oxymuriatic.

The uses of sal ammoniac are considerable. Besides being employed in the laboratory as the substance from which pure and carbonated ammonia are procured, it is used in substance by the dyer, the refiner of gold, the copper-smith, and the manufacturer of tin-plate.

Sal ammoniacum acetosum. The spirit of myndererus is occasionally so called. See **Aqua ammoniæ acetata.**

Sal ammoniacum liquidum. The liquid acetite of ammoniac is sometimes so termed. See **Aqua ammoniæ acetatæ.**

Sal ammoniacum martiale. See **Ferrum ammoniacale.**

Sal ammoniacum secretum glauberi. See **Sulphas ammoniacæ.**

Sal ammoniacum tartareum. See **Tartris ammoniacæ.**

Sal ammoniacum vegetabile. The liquid acetite of ammoniac. See **Aqua ammoniæ acetata.**

Sal ammoniacus fixus. The muriat of lime was formerly so termed. See **Lime** and **Murias calcis.**

Sal ammoniacus nitrosus. See **Nitras ammoniacæ.**

Sal catharticus amarus. See **Magnesia vitriolata.**

Sal catharticus anglicanus. See **Magnesia vitriolata.**

Sal catharticus Glauberi. See **Natron vitriolatum.**

Sal communis. A muriat of soda. See **Murias sodæ.**

Sal cornu cervi succo citri saturatum. Similar in virtues to the kali citratum. See **Kali citratum.**

Sal cornu cervi volatile. See **Ammonia preparata.**

Sal culinaris. See **Murias sodæ.**

Sal de duobus. The sulphat of potash was so called formerly. See **Kali vitriolatum.**

Sal diureticum vegetabile crystallizatum. This salt is merely an acetit of soda, and possesses antiscrophulous and aperient virtues.

Sal diureticus. See **Kali acetatum.**

Sal digestivus sylvii. A natural salt, formed of muriatic acid and potash. See **Murias potassæ.**

Sal epsomensis. See **Magnesia vitriolata**

Sal essentialis tartari. See **Tartar** (Acid of).

Sal febrifugus sylvii. See **Murias potassæ.**

Sal fontium. See **Murias sodæ.**

Sal fossilis. See **Murias sodæ.**

Sal geminæ. See **Murias sodæ.**

Sal herbarum. This salt is a carbonat of potash. See **Kali preparatum.**

Sal marinus. See **Murias sodæ.**

Sal martis. See **Ferrum vitriolatum.**

Sal martis muriaticum sublimatum. See **Murias ferri ammoniacalis.**

Sal microcosmicus. The compound saline matter obtained by inspissating human urine.

Sal mirabilis glauberi. See **Natron vitriolatum.**

Sal muriaticus. See **Murias sodæ.**

Sal plantarum. This salt is a carbonat of potash. See **Kali preparatum.**

Sal polychrestus. See **Kali vitriolatum.**

Sal polychrestus glaseri. A combination of sulphuric acid with potash. See **Kali vitriolatum.**

Sal polychrestus seignetti. See **Tartris sodæ, Seignet salt,** and **Mirabile.**

Sal prunellæ. See **Nitras potassæ fusus.**

Sal rupellensis. See **Tartris sodæ.**

Sal saturni. See **Cerussa acetata.**

Sal sedativus. See **Boracic acid.**

Sal sedativus Hombergii. See **Boracic acid.**

Sal sedlicensis. The same as Epsom salt. See **Magnesia vitriolata.**

Sal seidchulzensis. A sulphat of magnesia. See **Magnesia vitriolata.**

Sal seignetti. See **Tartris sodæ** and **Seignet salt.**

Sal succini. The succinic acid. See **Succinic acid.**

Sal tartari. Salt of tartar. See **Carbonas potassæ.**

Sal thermarum carolinarum. A union of sulphuric acid with magnesia. See **Magnesia vitriolata.**

Sal vegetabilis. See **Kali tartarisatum.**

Sal volatile. See **Spiritus ammoniæ compositus** and **Ammonia preparata.**

Sal volatilis salis ammoniaci. See **Ammonia preparata.**

SAL, one of the Cape de Verd Islands, 42 miles in circumference, lying to the E. of St. Nicholas. It has its name from the great quantity of salt made here from the sea water, which overflows part of it, from time to time. It is 300 miles W. of the coast of Africa. Lon. 22. 56 W. Lat. 16. 38 N.

SALA, or SALBERG, a town of Sweden, in Westmania, near which is a very large ancient silver mine. This town was first built by king Gustavus Adolphus, in 1624, and destroyed by fire in 1736. It is seated on a river, 30 miles W. of Upsal, and 50 N.W. of Stockholm. Lon. 17. 45 E. Lat. 59. 50 N.

SALACIA, in botany, a genus of the class gynandria, order triandria. Pistil one, calyx five-parted; corol five-petalled; anthers seated on the top of the germ. Two species; natives of China and Cochin-china, with shrubby stems, reddish-yellow flowers, and one of them a roundish, reddish, eatable berry.

SALA'CIOUS. *a.* (*salacis*, Lat. *salace*, Fr.) Lustful; lecherous (*Arbuthnot*).

SALA'CIOUSLY. *ad.* (from *salacious.*) Lecherously; lustfully.

SALA'CITY. *s.* (*salacitas*, Lat.) Lust; lechery (*Floyer*).

SA'LAD. *s.* (*salade*, Fr. *salaet*, German.) Food of raw herbs (*Watts*).

SALAMANCA, a city of Spain, in Leon, with a bishop's see, and a famous university, consisting of 24 colleges. The structure called the Schools, where the sciences are taught, is very large and curious. There were formerly 7000 students, when the Spanish monarchy was in a flourishing condition; and there are now upward of 4000, who are all clothed like priests, having their heads shaved, and wearing caps. Here are magnificent churches, a large public square, fine fountains, and every thing that can contribute to the beauty and commodiousness of the city. The cathedral is one of the handsomest in Spain; and there are several fine convents, with churches belonging to them, adorned with images, and some with curious pictures. It is seated partly in a plain, and partly on hills, and is surrounded by a wall. The river Tormes, which washes its walls, has a bridge over it 300 paces long, built by the Romans. Without the walls is a fine Roman causeway. A very signal battle was fought near this city on July 19th, 21st, 22d, 1812, between the French under general Marmont, and the allied forces under earl Wellington, which terminated in a splendid victory obtained over the French. Marmont lost an arm upon the occasion; the French had about 18,000 men killed and wounded, and more than 15,000 taken prisoners. It is 37 miles S.E. of Miranda, and 88 N.W. of Madrid. Lon. 5. 16 W. Lat. 41. 8 N.

SALAMANCA, a town of New Spain, in the province of Jucatan, 140 miles S. of Campeachy. Lon. 89. 58 W. Lat. 17. 55 N.

SALAMANDER. In zoology. See BASILISCUS.

SALAMIS, a daughter of the river Asopus, by Methone. Neptune became enamoured of her, and carried her to an island of the Ægean, which afterwards bore her name, and where she gave birth to a son called Ceuchreus.

SALAMIS, SALAMINS, or SALAMINA, now Coluri, an island in the Saronicus Sinus, on the southern coast of Attica, opposite to Eleusis, with a town and harbour of the same name. It is about 50 miles in circumference. It is celebrated for a battle fought there between the Greek and Persian fleet when Xerxes invaded Attica. The enemy's ships amounted to above 2000, and those of the Peloponnesians to about 380 sail. In this engagement, on the 20th of October, B. C. 480, the Greeks lost 40 ships, and the Persians about 200, besides an immense number which were taken. Teucer and Ajax, the sons of Telamon, who went to the Trojan war, were natives of Salamis.

SALANAKEM, or SALANKEMEN, a town of Sclavonia, remarkable for a battle gained by the prince of Baden, over the Turks, in 1691. It is seated on the Danube, 20 miles N.W. of Belgrade, and 25 S.E. of Peterwaradin. Lon. 20. 53 E. Lat. 45. 14 N.

SALARANO, a town of Italy, in the Milanese, situate on the Lambro, five miles W.S.W. of Lodi, and 15 S.E. of Milan. Lon. 9. 22 E. Lat. 42. 44 N.

SA'LARY. *s.* (*salaire*, French; *salarium*, Latin.) Stated hire; annual or periodical payment (*Swift*).

SALASCI, a people of Cisalpine Gaul, in continual war with the Romans. They cut off 10,000 Romans under Appius Claudius, A. U. C. 610, and were soon after defeated, and at last totally subdued and sold as slaves by Augustus.

SALBACH, a village of Germany, in the margravate of Baden, two miles N.E. of Baden. Here mareschal Turenne was killed, in 1675, while viewing the position of the enemy.

SALE. *s.* (*saal*, Dutch.) 1. The act of selling. 2. Vent; power of selling; market (*Sp.*). 3. A public and proclaimed exposition of goods to the market; auction (*Temple*). 4. State of being venal; price (*Addison*). 5. It seems in *Spenser* to signify a wicker basket; perhaps from *sallow*, in which fish are caught.

SALE OF GOODS. If a man agrees for the purchase of goods, he shall pay for them, before he carries them away, unless some term of credit is expressly agreed upon.

If a man upon the sale of goods, warrants them to be good, the law annexes to this contract a tacit warranty, that if they be not so, he shall make compensation to the purchaser; such warranty, however, must be on the sale. But if the vender knew the goods to be unsound, and has used any art to disguise them, or if in any respect they differ from what he represents them to be to the purchaser, he will be answerable for their goodness, though no general warranty will extend to those defects that are obvious to the senses.

If two persons come to a warehouse, and one buys, and the other, to procure him credit,

promises the seller, "if he do not pay you, I will;" this is a collateral undertaking, and void without writing, by the statutes of frauds; but if he say, let him have the goods, I will be your paymaster, this is an absolute undertaking as for himself, and he shall be intended to be the real buyer, and the other to act only as his servant. The question in these cases is always which party was originally trusted. For if the party to whom the goods are delivered was ever considered as responsible, the engagement of the other is void, unless it is in writing; after earnest is given, the vender cannot sell the goods to another without a default in the vender, and therefore, if the vendee does not come and pay, and take the goods, the vender ought to give him notice for that purpose; and then if he does not come and pay, and take away the goods in convenient time, the agreement is dissolved; and he is at liberty to sell them to any other person.

SA'LEABLE. *a.* (from *sale.*) Vendible; fit for sale; marketable (*Locke*).

SA'LEABLENESS. *s.* (from *saleable.*) The state of being saleable.

SA'LEABLY. *ad.* (from *saleable.*) In a saleable manner.

SA'LEBROUS. *a.* (*salebrosus*, Lat.) Rough; uneven; rugged.

SALECTO, a town of the kingdom of Tunis, near which are the remains of a large castle. It is seated near the Mediterranean, 22 miles S.S.E. of Monaster. Lon. 11. 3 E. Lat. 35. 13 N.

SALEM, in scripture geography, a place near Shechem, whither Jacob came as he returned from Mesopotamia.

SALEM, a town of Hindustan, in Mysore, now subject to the English; seated on a river that flows into the Cavery, 120 miles S.E. of Seringapatam. Lon. 78. 15 E. Lat. 11. 37 N.

SALEM, a seaport of Massachusets, capital of Essex county. It carries on a large trade to the West Indies, has some ship-building, and the harbour is defended by a fort and citadel. Here are seven edifices for public worship, and a bridge 1500 feet long, which connects the town with Beverley. It is situate on a peninsula, formed by two small inlets of the sea, called North and South rivers, 20 miles N.E. of Boston. Lon. 70. 50 W. Lat. 42. 30 N.

SALEM, a town of New Jersey, capital of a county of the same name. It has three edifices for public worship, and is seated on a branch of Salem creek, three miles from its mouth in Delaware bay, and 37 S.S.W. of Philadelphia. Lon. 75. 37 W. Lat. 39. 37 N.

SALEM, a town of N. Carolina, in Surry county, on the W. side of Wack creek, a branch of the Gargalis, which flows into the Yadkin. It is the principal settlement of the Moravians in this state, and 70 miles W. of Hillsborough. Lon. 80. 21 W. Lat. 36. 2 N.

SALEP. Salap. Salab. The root of the orchis morio of Linnéus. Orchis bulbis indivisis, nectarii labio quadrilobo crenulato, cornu obtuso, petalis dorsalibus reflexis. Class gynandria. Order diandria. This farinaceous powder is imported from Turkey. It may be obtained from several other species of the same genus of plants. It is an insipid substance, of which a small quantity, by a proper management, converts a large portion of water into a jelly, the nutritive powers of which have been greatly over-rated. Salep forms a considerable part of the diet of the inhabitants of Turkey, Persia, and Syria. The method of preparing the salep is as follows. The new root is to be washed in water, and the fine brown skin which covers it is to be separated by means of a small brush, or by dipping the root in warm water, and rubbing it with a coarse linen cloth. The roots, thus cleaned, are to be spread on a tin plate, and placed in an oven, heated to the usual degree, where they are to remain six or ten minutes. In this time they will have lost their milky whiteness, and acquired a transparency like horn, without any diminution of bulk. Being arrived at this state, they are to be removed in order to dry and harden in the air, which will require several days to effect; or they may be dried in a few hours, by using a very gentle heat. Salep, thus prepared, contains a great quantity of vegetable aliment; as a wholesome nourishment, it is much superior to rice; and has the singular property of concealing the taste of salt water. Hence, to prevent the dreadful calamity of famine at sea, it has been proposed, that the powder of it should constitute part of the provisions of every ship's company. With regard to its medical properties, it may be observed, that its restorative, mucilaginous, and demulcent qualities, render it of considerable use in various diseases, when employed as aliment, particularly in sea-scurvy, diarrhœa, dysentery, symptomatic fever, arising from the absorption of pus, and the stone or gravel.

SALERNO, a fortified seaport of Naples, capital of Principato Citeriore, and an archbishop's see, with a castle, and a university, principally for medicine. It is seated on a bay of the same name, 27 miles S.E. of Naples. Lon. 14. 53 E. Lat. 40. 35 N.

SA'LESMAN. *s.* (*sale* and *man.*) One who sells clothes ready made (*Swift*).

SA'LEWORK. *s.* (*sale* and *work.*) Work for sale; work carelessly done (*Shakspeare*).

SALIANT, in fortification, denotes projecting. There are two kinds of angles, the one saliant, which are those that present their point outward; the other re-entering, which have their points inwards. Instances of both kinds we have in tenailles and star-works.

SALIANT, SALIENT, or SAILLANT, in heraldry, is applied to a lion, or other beast, when its fore-legs are raised in a leaping posture. A lion salient is that which is erected bend-ways, standing so that his right fore-foot is the dexter chief point, and his hinder left foot is the sinister base point of the escutcheon, by which it is distinguished from rampant.

SALIC, or SALIQUE LAW, *lex salica*, an ancient and fundamental law of the kingdom of France, usually supposed to have been made

by Pharamond, or at least by Clovis, in virtue of which males are only to inherit. Du Haillan, after a critical examination, declares it to have been an expedient of Philip the Long in 1316, for the exclusion of the daughter of Lewis Hutin from inheriting the crown. Father Daniel, on the other hand, maintains that it is quoted by authors more ancient than Philip the Long, and that Clovis is the real author of it. This law has not any particular regard to the crown of France; it only imports, in general, that in salic land no part of the inheritance shall fall to any female, but the whole to the male sex. By salic lands, or inheritances, were anciently denoted, among us, all lands, by whatever tenure held, whether noble or base, from the succession to which women were excluded by the salic law; for they were by it admitted to inherit nothing but moveables and purchases wherever there were any males.

SALICORNIA. Sal-kali. Glasswort. Kelp. In botany, a genus of the class monandria, order digynia. Calyx inflated, entire, stamens one or two; petalless; seed one, inclosed in the calyx. Nine species; found on the sea-shores and marshes of most countries. The two following indigenous to England.

1. S. herbacea. Herb glasswort. Herbaceous, spreading; joints compressed at the top, notched; branches opposite; spikes cylindrical, scales obtuse: the stalks thick, jointed, succulent, trailing on the ground.

2. S. fruticosa. Shrubby glasswort. Stem shrubby, erect; joints of the branches two edged; floral scales truncate, membranaceous. These are both perennial, and found largely in Sheppey island: they are the kelp of the common people, who cut them towards the latter end of the summer when they are fully grown, on account of the great quantity of alkali they contain; to obtain which they first dry them in the sun and then burn them into ashes, whence the salt is easily procured in a pure state: though the ashes alone are often used in the manufacture of glass and soap.

SA'LIENT. *a.* (*saliens*, Latin.) 1. Leaping; bounding; moving by leaps (*Brown*). 2. Beating; panting (*Blackmore*). 3. Springing or shooting with a quick motion (*Pope*).

SALII, a college of priests at Rome, instituted in honour of Mars, and appointed by Numa, to take care of the sacred shields called Ancylia, B. C. 709. (See ANCYLE.) They were at first twelve in number, but their number was afterwards doubled by Tullus Hostilius. The Salii were all of patrician families, and the office was very honourable. The first of March was the day in which the Salii observed their festivals in honour of Mars. Their name seems to have been derived *a saliendo*, or *saltendo*, because, during their festivals, it was requisite they should leap and dance. Their feasts were uncommonly sumptuous, whence *dapes saliares* is proverbially applied to repasts splendid and costly.

SA'LINE. SALI'NOUS. (*salinus*, Latin.) Consisting of salt; constituting salt (*Harvey. Brown*).

SALINO, one of the Lipari islands, situated between Sicily and Italy, consists of two mountains both in a high state of cultivation. The one, lying more towards the north than the other, is rather the highest of the two, and is called *del Capo*, the head. The other is called *della Fossa felice*, or the happy valley. One third of the extent of these hills from the bottom to the summit is one continued orchard, consisting of vines, olive, fig, plum, apricot, and a vast diversity of other trees. The white roofs of the houses, which are every where interspersed amid this diversity of verdure and foliage, contribute to variegate the prospect in a very agreeable manner. The back part of almost all the houses is shaded by an arbour of vines, supported by pillars of brick, with cross poles to sustain the branches and foliage of the vines. Those arbours shelter the houses from the rays of the sun, the heat of which is quite scorching in these southern regions. The vines are extremely fruitful; the poles bending under the weight of the grapes.

The scenes in this island are more interesting to the lover of natural history than to the antiquarian. See RETICULUM. On the south side of the island, however, there are still to be seen some fine ruins of an ancient bath, a Roman work. They consist of a wall 10 or 11 fathoms in extent, and terminating in an arch of no great height, of which only a small part now remains. The building seems to have been reduced to its present state rather by the ravages of men than the injuries of time. Almost all the houses in the island are built of materials which have belonged to ancient monuments. The ancients had, in all probability, baths of fresh as well as of salt water in this island; for, whenever the present inhabitants have occasion for a spring of fresh water, they have only to dig a pit on the shore, and pure sweet water flows in great abundance.

There were formerly mines of alum here, from which the inhabitants drew a very considerable yearly revenue. But whether they are exhausted, or whatever circumstance may have caused them to be given up, they are now no longer known. The island abounds in a variety of fruits.

SALINS, a considerable town of France, in the department of Jura, with a strong fort. It is remarkable for its salt-works, the largest of which is in the middle of the town, and is like a little fortified place. It is seated in a fertile valley, on a stream that has its source in the town, 29 miles S. of Besançon, and 200 S.E. of Paris. Lon. 6. 5 E. Lat. 46. 56 N.

SALISBURIA, in botany, a genus of the class monoecia, order polyandria. Male: ament naked, filiform; anthers numerous, incumbent, deltoid. Female: solitary; calyx four-cleft; corolless; drupe with a triangular nut. One species, salisburia adiantifolia, or pink-leaved, the ginkgo of Linnæus, a Chinese and Japan tree, with large, fan-shaped

leaves, cloven half-way down, irregularly notched, thickened at the edge, glabrous.

SALISBURY, or NEW SARUM, a city in Wiltshire, of which it is the capital, with a market on Tuesday and Saturday, and a bishop's see. It is situate in a chalky soil, almost surrounded by the Avon and its contributory rivers, and is rendered particularly clean by a small stream flowing through every street. It has a fine cathedral, crowned by a spire, the loftiest in the kingdom. The town-hall is a handsome building, and stands in a spacious market-place. Salisbury in 1801 contained 7668 inhabitants: it is governed by a mayor, sends two members to parliament, and has manufactures of flannels, linseys, hardware, and cutlery. It is 21 miles N.E. of Southampton, and 83 W. by S. of London. Lon. 1. 42 W. Lat. 51. 3 N.

SALISBURY CRAIG, a hill on the S. side of the city of Edinburgh. It is remarkable for a great precipice of solid rock, about one mile long, and, in some parts, 100 feet high; which passes with some regularity along its brow.

SALISBURY PLAIN, in Wiltshire, extends 25 miles E. to Winchester, and 25 W. to Shaftsbury, and, in some places, is from 35 to 40 miles in breadth. There are so many cross roads on it, and so few houses to take directions from, that Thomas, earl of Pembroke, planted a tree at each milestone from Salisbury to Shaftsbury, for the traveller's guide. That part of it about the city is a chalky down; the other parts are noted for feeding numerous flocks of sheep, some of which contain from 3000 to 5000 each. In this plain, beside the famous Stonehenge, are traces of many Romish and British antiquities.

SALIVA. (*saliva*, so called *à salino sapore* from its salt taste, or perhaps from σιαλος, spittle.) The fluid which is secreted by the salivary glands into the cavity of the mouth. The secretory organ is composed of three pair of salivary glands. 1. The parotid glands, which evacuate their saliva by means of the Stenonian duct behind the middle dens molaris of the upper jaw. 2. The submaxillary glands, which pour out their saliva through the Warthonian ducts on each side of the frenulum of the tongue by a narrow osculum. 3. The sublingular glands, situated between the internal surface of the maxilla and the tongue, and pour out their saliva through numerous Riverian ducts at the apex of the tongue.

The saliva in the cavity of the mouth has mixed with it, 1. The mucus of the mouth, which exhales from the labial and genal glands. 2. A roscid vapour, from the whole surface of the cavity of the mouth. The saliva is continually swallowed with, or without masticated food, and some is also spit out. It has no colour nor smell; it is tasteless, although it contains a little salt, to which the nerves of the tongue are accustomed. Its specific gravity is somewhat greater than water. Its consistence is rather plastic and spumous, from the entangled atmospheric air. The quantity of twelve pounds is supposed to be secreted in twelve hours. During mastication and speaking the secretion is augmented, from the mechanical pressure of the muscles upon the salivary glands. Those who are hungry secrete a great quantity, from the sight of agreeable food. It is imperfectly dissolved by water; somewhat coagulated by alkohol of wine; and is congealed with more difficulty than water. It is inspissated by a small dose, and dissolved in a large dose, of mineral acids. It is also soluble in aerated alkali. Caustic alkali and quick lime extract volatile alkali from saliva. It corrodes copper and iron, and precipitates silver and lead in the form of corneous luna. It assists the spirituous fermentation of farinaceous substances; hence barbarous nations prepare an inebriating drink from the chewed roots of the jatropha manihot and piper methisticum. It possesses an antiseptic virtue, according to the experiments of the celebrated Pringle. It easily becomes putrid in warm air, and gives off volatile alkali.

Constituent principles.—Saliva appears to consist of water, albumen, ammoniacal salt, and animal earth. Of water, there is $\frac{4}{5}$ given out by distillation. The albumen is detected by alkohol of wine. The ammoniacal salt is demonstrated by triturating quick lime with saliva; and the animal earth from salival calculus, and the products of fire.

The use of the saliva is, 1. It augments the taste of the food, by the evolution of sapid matter. 2. During mastication, it mixes with, dissolves, and resolves into its principles, the food; and changes it into a pultaceous mass, fit to be swallowed; hence it commences chymification. 3. It moderates thirst, by moistening the cavity of the mouth and fauces.

SALIVAL DUCTS. The excretory ducts of the salival glands. That of the parotid gland is called the Stenonian duct: those of the submaxillary glands, the Warthonian ducts; and those of the sublingual, the Riverian duct.

SALIVAL GLANDS. Those glands which secrete the saliva are so termed. See SALIVA.

To SA'LIVATE. *v. a.* (from *saliva*, Latin.) To purge by the salival glands (*Wiseman*).

SALIVATION, in medicine, a promoting of the flux of saliva, by means of medicines, mostly by mercury. The chief use of salivation is in diseases belonging to the glands and membrana adiposa, and principally in the cure of the venereal disease; though it is sometimes also used in epidemic diseases, cutaneous diseases, &c. whose crises tend that way.

SALI'VOUS. *a.* (from *saliva*.) Consisting of spittle; having the nature of spittle (*Wis.*).

SALIX. Willow. Osier. In botany, a genus of the class dioecia, order diandria. Calyx a scale of the ament; corolless. Male: stamens from one to five, with a nectariferous gland at the base. Female: stigmas two; capsule superior, one-celled, two-valved; seeds invested with down. Seventy species, chiefly natives of Europe, a few of the other quarters of the globe; thirty-eight indigenous to the marshes, rivulets, moist sands, moist woods and

hedges of our own country. They are thus subdivided.

A. Leaves serrate, glabrous or nearly so.

B. Leaves quite entire or nearly so.

C. Leaves villous.

The following are chiefly entitled to attention, as being the cultivated species.

1. S. triandra. Long-leaved three-stamened willow. Triandrous; leaves, linear-oblong; germs pedicelled. Thirty feet high, sometimes higher; but being one of the best osiers for the use of basket-makers, is generally cut and kept low; the bark of the stem and branches spontaneously exfoliates, like that of the plane-tree; branches upright, long, slender, pliable and tough, though somewhat brittle at their insertion; leaves three or four inches long, tapering towards the base and terminating in a point, the margin thickly serrate: sometimes flowers both in spring and autumn. Male: aments very numerous of a bright yellow colour, and agreeable scent.

2. S. pentandra. Bay-leaved willow. Pentandrous; leaves elliptic-lanceolate, crenulate; germs glabrous, nearly sessile. Well known on account of its broad, odoriferous leaves: it rises ten or twelve feet; the aments fragrant; bark astringent and bitter, and sometimes employed for the purposes of the bark of salix fragilis.

3. S. vitellina. Yellow willow. Leaves lanceolate, acute, without stipules, a little silky underneath, with cartilaginous serratures; stigmas emarginate: a middle-sized tree, much branched at the top; the male tree usually smaller than the female. Wood white and tough; the shoots used by basket-makers; the down will make ordinary paper, and may serve some of the purposes of genuine cotton; the bark is used medicinally as that of salix fragilis; and occasionally employed in dyeing.

4. S. amygdalina. Broad-leaved three-stamened willow. Triandrous; leaves-ovate, oblique; germs pedicelled; stipules very large. Trunk low, bark deciduous; found in bogs.

5. S. hastata. Halbert-leaved willow. Leaves somewhat ovate, acute, sessile; stipules somewhat heartshaped. A low tree; found in Lapland, and Switzerland.

6. S. fragilis. Crack-willow. Leaves lanceolate, pointed; petioles with glandular teeth; nectary of the males double. One of the largest trees of the kind; a native of most parts of Europe, especially of the northern parts; indigenous to our own rivulets: bees are fond of the male-flowers. It is called in some medical works salix alba, or white willow; the bark is bitter to the taste and very astringent. It is used as a substitute for Peruvian bark in intermittents and other diseases requiring tonics, and often with benefit.

7. S. Babylonica. Weeping-willow. Leaves linear-lanceolate; petioles glandular; branches pendulous. A native of the Levant: grows to four feet and a half in circumference at three feet above the ground, and to thirty feet in height; a common and highly ornamental tree.

8. S. purpurea. Bitter purple willow. Monandrous, decumbent; leaves obovate-lanceolate; stigmas very short, obovate, nearly sessile. A bushy shrub, three or four feet high, with slender purple shining branches. Indigenous to the rivulets of England.

9. S. helix. Rose willow. Monandrous, erect; leaves lanceolate, pointed; style long, filiform; stigmas linear. A slender tree of nine or ten feet height, with rose-like excrescencies at the end of the branches; whence its English name. It is a native of England and many other parts of Europe.

10. S. fissa. Basket osier. Leaves alternate, pedicelled, minutely toothed. A shrub four or five feet high, with erect flexible and very tough branches, of a yellowish ash colour, sometimes purplish. A native of various parts of Europe, on the sandy banks of rivers, and in England cultivated in fens as preferable to all other willows or osiers for basket-work.

11. S. rubra. Green osier. Leaves linear-lanceolate, elongated, acute, of the same colour on both sides; stigmas somewhat ovate. A shrub indigenous to our own country.

12. S. caprea. Round-leaved sallow. Leaves ovate, pointed, serrate, undulate, downy underneath; stipules somewhat lunate; capsules swelling. Often grows to a large tree: the bees are fond of its flowers, which appear early. It is a native of our own woods; and its bark is employed medicinally as that of salix fragilis, which it resembles in its virtues.

13. S. cinerea. Common sallow, or ashy-leaved willow. Leaves nearly very entire, obovate-lanceolate, glaucous, slightly villous, and reticulate underneath; stipules half heart-shaped, serrate. Indigenous to the boggy woods of our own country; from six to twelve feet high; flowers in April.

14. S. alba. White willow. Leaves lanceolate, pointed, serrate, silky on both sides; the lowest serratures glandular; stigmas two-parted. A large and lofty tree of quick growth, but soon decays when lopped; wood white, light and tough: flowers in April and May. A native of our own woods.

15. S. viminalis. Osier. Leaves lance-linear, very long, pointed, very entire, silky underneath; branches wand-like; style elongated. A tall, slender, obsequious, quick-growing shrub; a native of England and of most parts of Europe.

All these are trees or arborescent shrubs; fond of watery situations, but will grow in any soil; usefully cultivated in low wastes, and on the sides of moist ditches, as plantations for basket-work.

SALLAD. See SALAD.

SALLAD CORN. In botany. See VALERIANA.

SALLEE, an ancient town of the kingdom of Fez, with an harbour and several forts. Its harbour is one of the best in the country, and yet, on account of a bar that lies across it, ships of the smallest draught are forced to unload, and take out their guns, before they can get into it. There are docks to build ships,

but they are seldom used, for want of skill and materials. It is divided into the old and new town, by the river Guero; and has long been famous for its pirates, which make prizes of all Christian ships that come in their way, except there is a treaty to the contrary. It is 100 miles W. of Fez, and 150 S. of Gibraltar. Lon. 6. 31 W. Lat. 34. 0 N.

SALLENDERS, in veterinary science, a disease of the skin of a horse's hock or hough, of the nature of the mallenders, and requiring the same treatment. See MALLENDERS.

SALLENGRE (Albert Henry de), an ingenious writer, born at the Hague in 1694. His father was receiver-general of Walloon Flanders, who sent him to Leyden; where, after finishing his education, he was admitted an advocate in the court of Holland. After the peace of Utrecht in 1713, he went to France, and afterwards visited England, where he was elected a fellow of the Royal Society. He wrote commentaries upon the epistles of Ovid, and other classical works; and was writing a history of the United Provinces at the time of his death, in 1723.

SALLET, or SALLETING. See SALAD.

SALLO (Dennis de), born at Paris in 1626, was the first who projected a literary journal. This was the Journal des Scavans, which began in 1665, and gave rise to journals of a similar kind in other countries. He died in 1669.

SALLOW. In botany. See SALIX.

SA'LLOW. *a.* (*salo*, German, black; *sale*, French, foul.) Sickly; yellow (*Rowe*).

SA'LLOWNESS. *s.* (from *sallow*.) Yellowness; sickly paleness (*Addison*).

SALLUST (Crispus Sallustius), a Latin historian, born at Amiternum, in the country of the Sabines. He performed the offices of questor and consul, and the depravity of his manners did not escape the censure of the age. He was degraded from the dignity of a senator, B. C. 50; but, by embracing the cause of Cæsar, he was restored to that rank, and made governor of Numidia. In the administration of his province, Sallust behaved with uncommon tyranny; he enriched himself by plundering the Africans. He married Terentia, the divorced wife of Cicero; and from this circumstance, according to some, arose an immortal hatred between the historian and the orator. Sallust died in the 51st year of his age, 35 years before the Christian era. As a writer he is peculiarly distinguished. He had composed a history of Rome, but nothing remains of it except a few fragments; and his only compositions extant are his history of Catiline's conspiracy, and of the wars of Jugurtha, king of Numidia. In these works the author displays a wonderful knowledge of the human heart. No one was better acquainted with the vices that prevailed in the capital of Italy, and no one seems to have been more severe against the follies of the age, and the failings of which he himself was guilty.

The editio princeps of Sallust, by Spira, was in folio, and printed at Venice in 1470: besides which there were about thirty editions of the same historian in the fifteenth century. The editions of Aldus (in 1509-21), of Elzevir in 1634, and the Cambridge edition of 1710, are much valued. Cortius and Haverkamp, also, deserve much praise. But one of the most correct is the Edinburgh edition of 1755. "I have read it five times through," says Harwood, "and have not discovered a single error." Besides these, we shall merely specify Homer's edition, published by Payne, in 1789; and the last and best edition of Harles, published at Nuremberg, in 1797.

There were other Sallusts, as a nephew of the historian, by whom he was adopted. He was very effeminate and luxurious. Horace dedicated 2, od. 2, to him.—There was also two others of this name, both great favourites of the emperor Julian, at whose death one of them was universally named by the officers of the Roman empire, to succeed on the imperial throne; but he refused this honour, and pleaded infirmities and old age. The Romans wished upon this to invest his son with the imperial purple, but Secundus opposed it, and observed that he was too young to support the dignity.

SA'LLY. *s.* (*sallie*, French.) 1. Eruption; issue from a place besieged; quick egress (*Bacon*). 2. Range; excursion (*Locke*). 3. Flight; volatile or sprightly exertion (*Stillingfleet*). 4. Escape; levity; extravagant flight; frolic; wild gaiety; exorbitance (*Swift*).

To SA'LLY. *v. n.* (from the noun.) To make an eruption; to issue out (*Tate*).

SALLY-PORTS, in fortification, or postern-gates, as they are sometimes called, are those under-ground passages which lead from the inner works to the outward ones; such as from the higher flank to the lower, or to the tenailles, or the communication from the middle of the curtain to the ravelin. When they are made for men to go through only, they are made with steps at the entrance and going out. They are about 6 feet wide and 8½ feet high. There is also a gutter or shore made under the sally-ports, which are in the middle of the curtains, for the water which runs down the streets to pass into the ditch; but this can only be done when they are wet ditches. When sally-ports serve to carry guns through them for the out-works, instead of making them with steps, they must have a gradual slope, and be eight feet wide.

SALM, a town of Germany, capital of a county in the duchy of Luxemburg, 11 miles S.S.E. of Spa, and 38 N. of Luxemburg. Lon. 5. 55 E. Lat. 50. 25 N.

SALM, a town of France, in the department of Meurthe, with a castle, seated at the source of the Sar, 20 miles W. of Strasburg, and 55 S.E. of Nanci. Lon. 7. 15 E. Lat. 48. 34 N.

SALMACIS, a fountain of Caria, which rendered effeminate all those who drank it. It was there that Hermaphroditus changed his sex, though he still retained the characteristics of his own.

SALMAGU'NDI. *s.* (*selon mon gout*, or

salé à mon gout.) A mixture of chopped meat and pickled herrings, with oil, vinegar, pepper, and onions.

SALMANASAR, king of Assyria, succeded his father Tiglathphalasar, A. M. 3276. He took Samaria, and carried the people away into captivity, thereby putting an end to the kingdom of Israel. He was afterwards defeated by the Tyrians, and died 714 B. C. He was succeeded by his son Sennacherib.

SALMASIA, in botany, a genus of the class pentandria, order trigynia. Calyx five-parted; corol five-petalled; styleless; capsule three-celled, three-valved, many-seeded. One species; a Guiana shrub, with hairy branches, and white racemed flowers.

SALMASIUS (Claudius), a French writer of uncommon abilities and immense erudition, descended from an ancient and noble family, and born at or near Semur, in 1596. His mother, who was a protestant, infused her notions of religion into him, and he at length converted his father: he settled at Leyden; and in 1650 paid a visit to Christina queen of Sweden, who is reported to have shown him extraordinary marks of regard. Upon the violent death of Charles I. of England, he was prevailed on by the royal family, then in exile, to write a defence of that king; which was answered by our famous Milton in 1651, in a work entitled Defensio pro Populo Anglicano contra Claudii Salmasii Defensionem Regiam. This book was read over all Europe; and conveyed such a proof of the writer's abilities, that he was respected even by those who hated his principles. Salmasius died in 1653; and some did not scruple to say, that Milton killed him by the acuteness of his reply. His works are numerous, and of various kinds; but the greatest monuments of his learning are, his Notæ in Historiæ Augustæ Scriptores, and his Exercitationes Plinianæ in Solinum.

SALMO. Salmon. In zoology, a genus of the class pisces, order abdominalia. Head smooth, compressed: mouth large; lips small; tongue white, cartilaginous, moveable; eyes moderate, lateral; teeth in the jaws and on the tongue; gill-membrane from four to twelve-rayed, the cover of three laminæ; body long, covered with rounded and very finely striate scales; back convex; lateral line straight, nearer the back; hindermost dorsal fin fleshy, without rays; ventral fins of many rays. Fifty-five species, inhabitants of the seas of Europe or America; one or two, inhabitants of the Nile; ten or twelve common to the waters of our own country. Most of the fishes of this family are found in rapid, stony rivers, and are impatient of foul water; a few of them inhabit the sea, but get into rivers once a year, for the purpose of depositing their spawn in beds of gravel; for this purpose they will surmount any difficulties, ascend many hundred miles up, force themselves against the most rapid streams, and spring with amazing agility over any thing that happens to impede them, to the height of seven or eight feet; after spawning they return to the sea, poor and lean; they feed on other fishes; vary much in their colours; the vent is near the tail. They are thus divided into sections.

A. Body variegated.
B. Dorsal and anal fins opposite.
C. Teeth hardly visible or none.

The following are chiefly worthy of notice.

1. S. salar. Common salmon. Upper jaw extending beyond the lower. Inhabits chiefly the northern seas, and ascends rivers annually, in large shoals, for the purpose of spawning; swims near the surface, but during storms sinks to the bottom; is said to be fearful of any thing red, but allured by a white colour; grows rapidly, and sometimes reaches to six feet long; feeds on fishes, worms, and insects: body above blackish, the sides blueish, beneath silvery, sometimes with cinereous or blackish spots; scales deciduous; flesh red.

A more minute description of the parts of the common salmon would be superfluous. It is found over all the north of Europe and Asia, from Britain to Kamschatka; but does not venture into the warm or intratropical latitudes. It is frequent as far north as Greenland, and is seen in some of the rivers of France; but none have been caught so far south as the Mediterranean.

The salmon is an ocean fish, and therefore is only found in those rivers and lakes that communicate with the sea. As the ancient Grecians never extended their empire to the ocean, they were unacquainted with this excellent fish; and hence their language has no name to distinguish it. The extent of the Roman territory gave them many opportunities of being acquainted with the salmon; and in their language it has a name from which ours is borrowed; the word seems to express its bounding or leaping, being probably derived from *salio*.

Among several nations the salmon has different names, according to the age of the fish. The Romans distinguished them into salmones, fariones, and salares, according to their age.

Teque inter geminas species neutrumq. et utrumque,
Qui nec dum salmo, nec jam salar, ambiguusque;
Amborum, medio fario, intercepte sub ævo.
AUSON.

In England, the inhabitants of Yorkshire call those of the first year, smelts; of the second, sprods; of the third, morts; of the fourth, fork-tails; and of the fifth, half fishes; for it is not till the sixth year that this animal attains its full size.

There are salmon-fisheries in Iceland, Norway, and Lapland; but no where are they carried on to greater extent than in Britain and Ireland; the fishery of Colraine, in the latter kingdom, being an inexhaustible fund of provision and of wealth.

The long migrations of the salmon at the spawning season is, perhaps, the most extraordinary part of its history. It annually mounts rivers, sometimes, as we have already observed,

to the distance of several hundred miles, till it finds a place in their gravelly bed, fit for depositing the seeds of a future family. It easily makes its way against the most rapid current, and will leap up cataracts of an astonishing height. In endeavouring to surmount these perpendicular falls, it often fails in the attempt and tumbles back into the water, and thus is in some places caught in baskets placed below the current.

The manner of depositing their spawn, after having performed these arduous journeys, is curious. When a proper place is selected for the purpose, the male and female unite in digging a pit of eighteen inches deep, into which the former ejects his milt, and the latter her spawn: the place is carefully covered over with their tails, which at that period are worn bare. In this state, the spawn lies buried from December till spring, if not disturbed by violent floods; while, in the mean time, the parent fishes hasten back to purify and strengthen themselves in the sea; for, after spawning, they are lean and flabby. It is when they first leave the sea that they are plump and vigorous; and such as are in that condition have a number of insects adhering to them above the gills.

About the latter end of March, the ova begin to exclude the young salmon, which find their way upwards, and swarm in numbers, of which it is difficult to form any idea. They are then termed fry in Scotland, and smelts in England; and they remain in the fresh water till the arrival of a flood, by which they are swept down into the sea. In June, the young salmon begin to appear again in the rivers, and increase with amazing rapidity in size; for in June, when they appear first in the rivers, they are only about a foot or fourteen inches in length; and in August some are seen eight or nine pounds.

The quick growth of the salmon is by no means occasioned by their voracity; for all the fishermen agree, that no food is ever found in their stomach. Perhaps this may be owing to a temporary neglect of food about the season of spawning, or to fecundation, as is the case with the sea-lions. It is well known that the angler takes them successfully with the fly, the worm, or small fish, an evident proof that these are the animals on which they feed.

At Berwick, on the river Tweed, the capture of the salmon is immense during the month of July. At that season, they are salted, and barrelled up for exportation: even the prodigious consumption of London not being able to keep pace with the vast loads that are daily taken.

Upon the Tweed there are above forty different fisheries, extending about fourteen miles up the river, which were lately rented at the sum of 5400*l.* annually. The expence of fishing-tackle, servants' wages, and other requisites, amount nearly to an equal sum; so that upwards of 10,400*l.* must be obtained by the different lessees, before they can clear their expences; and hence, 208,000 salmon must be caught there, upon an average, every year, before any profit can accrue to the tenants.

The fishing season commences on the 30th November, and ends on Michaelmas day. The corporation of Berwick are conservators of the fishery, part of which belongs to that town. The river being the boundary of the two nations, the whole north side is Scotch property.

The rivers both of Scotland and Ireland abound with these fishes; and a pretty extensive capture is made in some of them. The mode of preserving them is nearly the same with that practised in Berwick, and the markets are similar; for in these kingdoms they begin to export during the summer months, after the London market is supplied. Very severe laws have been enacted in Scotland for the preservation of salmon. So late as the reign of James IV. killing this fish was made capital after the third offence; before that period, the culprit might redeem his life.

Various causes have of late operated to the prejudice of the British trade in this important article. The great increase of the Newfoundland fishery has reduced the price of salmon in the foreign markets, while the gradual increase of knowledge throughout Europe has led to a much greater relaxation in the discipline of the Romish church, and particularly in regard to abstinence; a regimen which is daily losing credit as a spiritual restorative. And to these circumstances we may also add, the great improvement in agriculture that has every where taken place in these kingdoms within the last fifty years; which, by the frequent application of lime upon the soil, has probably greatly diminished the number of salmon, as well as of other river fishes.

2. S. trutta. Salmon trout. Bull trout. Sea trout. Body with black spots encircled with brown; pectoral fin with six dots.

Another variety with the first dorsal fin spotted; tail black, much forked, which in Cumberland is called white trout.

This species is larger than the common trout, and differs from it in its habits and colour, as well as in size. It annually migrates like the salmon, from the sea; and after having deposited its spawn, again returns to its favourite residence in the ocean. The shape is more thick than that of the river-trout, its weight is sometimes above three pounds, and it measures nearly two feet in length. It differs from the salmon, in having the tail terminating in a straight line. The head is thick, smooth, and dusky; the back is of the same colour, but grows fainter towards the sides, which are marked with large irregular spots of black. The flesh, when boiled, is paler than that of the salmon, but grateful to the taste.

The white trout seldom exceeds a foot in length, and migrates out of the sea into the Esk, in Cumberland.

3. S. fario. Trout, or river trout. Body with purple red spots, lower jaw a little longer.

Another variety, brown with violet spots; the sides whitish yellow, with red spots sur-

rounded with white and a brown area, beneath white.

The common trout is a fish universally known in this island, for the delicacy of its flesh, for the sport it affords to the angler, and for the superior beauty of its colours. These vary greatly in different waters: In Llyndivi, a lake of South Wales, there are trouts marked with red and black spots, as large as sixpences. In Loch Neagh in Ireland, and Hulse Water in Cumberland, there are trouts taken which weigh about thirty pounds. These are probably of the same variety with the celebrated trout of the lake of Geneva. The size alone of these fishes can recommend them; for in taste and flavour they are all inferior to our common river-trout.

It is remarkable that neither the Greek nor Roman authors make any mention of this fish, and that a species of such delicacy should never have become a fashionable dish! for in the Italian rivers the trout abounds, and in all probability did so at the time when the Romans were transporting oysters from Sandwich, and the livers of the scari from the coast of Africa. But it was perhaps owing to its proximity of situation, and to the ease with which it might be procured, that the trout was despised by the voluptuaries of Rome, who scrupled not to lavish a large fortune on a dish of flamingo's tongues, and peacock's brains.

It is the voracity of the trout that leads the way to its destruction, and makes it a prey to the inventions of the angler: for the trout feeds not only on worms and marine insects, but on other fishes, and even on those of its own tribe.

4. S. alpinus. Red charr. Back black; sides pale blue; belly orange.

This species is very properly denominated the Alpine charr by Linnæus; for its constant residence is in the lakes of the high and mountainous parts of Europe. A few are found in some of the lakes in Wales, and in Loch Inch in Scotland; from which last it is said to migrate into the Spey to spawn. Seldom, however, does this species venture into any running stream; its principal resort is in the cold lakes of the Lapland Alps, where it is fed by innumerable larves of gnats that infest those dreary regions. When the Laplanders migrate to the distant lakes during summer, they find a ready and luxurious repast in these fishes; which to them are extremely palatable without any sauce, accustomed as they are to temperance and severe exercise.

The largest and most beautiful charrs are found in the lake of Winander-Mer, in Westmorland, and in this resort we meet not merely with the red, but with the gilt, and the case-charr. These kinds are nearly similar in their external appearance; but the time and manner of their spawning are so different, as to allow of their forming distinct species. The case-charr spawns about Michaelmas, and chiefly in a river that runs into the lake called the Brathy. The spawning season of the gilt charr is from the beginning of January to the end of March: they never ascend the river; but make choice of a springy part of the lake, where the bottom is smooth and sandy.

The figure of the charr is more slender and lengthened than that of the trout. The colour of the back is an olive green, variegated with spots of a dusky white, and others of a dull yellow. The belly is of a pale red, in the female greatly diluted, and approaching to white. The whole body is covered with very minute scales. The manner of taking these fishes is with nets or trammels, as they are called, which are furnished with bait to allure the fish, and left set for several days, till they are known to enter them.

5. S. laveretus. Gwiniad. Upper jaw longer; dorsal fin fourteen-rayed. Another variety with a broader body and nassiform snout, called lavaret.

This species seems to constitute an intermediate tribe between the trout and the herring; like the latter, it suddenly dies when taken out of the water. In length, it is nearly a foot, laterally compressed, has two fins upon the back; the first about three inches from the snout, and supported by thirteen rays; the second, which is placed near the tail, is thick, fat, and altogether without rays. It is this spurious fin which Willoughby assumes as the generic mark of all the fishes of the trout kind.

This fish, like the charr, is of an alpine nature, and inhabits the lakes of the mountainous parts of Europe; such as Switzerland, Savoy, Norway, Sweden, Lapland, and Scotland. Into the last-mentioned country it is said to have been introduced from France, by the unfortunate queen Mary; a circumstance rendered probable by the French name *vangis*, given it by the inhabitants in the vicinity of Lochmaben. The British name of gwiniad is bestowed upon it from the whiteness of its scales. The gwiniad is a gregarious fish, swims near the surface in a long column, with a leader, and approaches the shores in vast shoals, in summer and spring, which are the seasons in which it is taken. In some of the German lakes it is caught in vast abundance, and salted up for sale in the neighbouring towns. The flesh is insipid, and will not preserve for any time without salt.

6. S. eriox. Sewen. Grey salmon. Body with cinereous spots; tail even; head more sloping and shorter than the salmon. Inhabits European seas, and found in our own; is much less than the salmon, and the flesh paler, but ascends rivers like it.

7. S. eperianus. Smelt. Head diaphonous; rays of the anal fin seventeen; eyes large, pupil black, iris silvery; in the front of the upper jaw four large teeth; palate with two rows of teeth; tongue with two rows of larger. Inhabits the shores of Europe, and ascends rivers in vast shoals in the spawning season; is very fertile, and feeds on worms and testaceous animals; has a peculiar smell, is subdiaphonous, shining, covered with silvery deciduous scales; body above cinereous, the sides silvery,

green and blue, beneath reddish-white; varies in size from three to thirteen inches; the largest have the faintest smell.

8. S. thymallus. Grayling. Upper jaw longer; dorsal rays twenty-three; body elongated, above silvery-grey, varied with blue, beneath white; scales large and hardish; flesh excellent. Inhabits Europe and Siberia, in clear and rapid mountainous streams; two feet long; swims swiftly and grows very fast; feeds on testaceous animals, smaller fishes, insects, and the spawn of fishes; and is the prey of aquatic birds.

SALMODIA. (Italian.) Psalmody.

SALMON, in ichthyology. See SALMO.

SALMON-FISHING. These fishes bite best at about three o'clock in the afternoon, in the months of May, June, July, and August, if the water be clear and some small breeze of wind be stirring, especially if the wind blows against the stream, and near the sea.

A salmon is caught like a trout, with worm, fly, or minnow, and the garden-worm is an excellent bait for him, if well scoured and kept in moss twenty days, by which time the worms will be very clear, tough, and lively.

The salmon has not his constant residence like the trout, but removes often, coveting to be as near the spring-head as may be, swimming generally in the deepest and broadest parts of the river, near the ground. There is a particular manner of fishing for the salmon, with a ring of wire on the top of the rod, through which a line may run to what length is thought convenient, having a wheel also near the hand.

The artificial fly is a good bait for a salmon, but you must then use a troll, as for the pike, he being a strong fish: as the salmon is a large fish, so must your flies be larger than for any other, with wings and tails very long. Though when you strike him, he will plunge amain, yet he does not usually endeavour to run to the length of the line, as the trout will do, and therefore there is less danger of breaking your line.

If you would angle for salmon at ground, take three or four garden-worms, well scoured, and put them on your hook at once, and fish with them in the same manner that you do for trouts.

SALMON LOUSE. In helminthology. See SERPÆA.

SALMON TROUT. See SALMO.

SALO, a town of Italy, in the Bresciano; taken by the French in August 1796. It is seated on the lake Digarpa, 17 miles N.E. of Brescia. Lon. 10. 49 E. Lat. 45. 38 N.

SALON, or SALOON, in architecture, a grand, lofty, spacious sort of hall, vaulted at top, and usually comprehending two stories, with two ranges of windows. It is sometimes built square, sometimes round or oval, sometimes octagonal, as at Marly, and sometimes in other forms.

SALONÆ, a town of Dalmatia, about 10 miles distant from the coast of the Adriatic. It was the native place of the emperor Diocesian, and he retired there to enjoy tranquillity, after he had abdicated the imperial purple.

SALONICA, the ancient Thessalonicæ, a city of European Turkey, capital of Macedonia, and an archbishop's see. It is ten miles in circumference, and a place of great trade, carried on principally by the Greeks and Jews, the former of which have 30 churches, and the latter nearly as many synagogues: the Turks have also a few mosques. The inhabitants are computed at 60,000. It is surrounded by walls, and defended on the land side by a citadel, and near the harbour by three forts. It was taken from the Venetians, by the Turks, in 1431. It is seated at the head of a noble gulf of the Archipelago, 310 miles W. of Constantinople. Lon. 23. 5 E. Lat. 40. 53 N.

SALONINA, a celebrated matron, who married the emperor Gallienus. She was the patroness of the fine arts, and to her mildness and benevolence Rome was indebted some time for her peace and prosperity. She was put to death by the hands of the conspirators, who assassinated her husband and family, about the year 268 B. C.

SALONINUS, a son of Asinius Pollio. He received his name from the conquest of Salonæ by his father. Some suppose that he is the hero of Virgil's fourth eclogue, in which the return of the golden age is so warmly and beautifully anticipated.

SALPA. In zoology, a genus of the class vermes, order mollusca. Body loose, nayant, gelatinous, tubular, and open at each extremity; intestine placed obliquely. Eleven species, inhabitants, for the most part, of the Mediterranean, two or three of the Red Sea. They are thus subdivided.

A. Furnished with an appendage.

B. Without appendage.

The animals of this genus are of a gregarious nature, and often adhere together; they swim with great facility, and have the power of contracting or opening at pleasure the cavities at the extremities.

SALPE, a town of Naples, in Capitanata, near which are some salt works. It is situate on a lake, near the sea, 23 miles S. of Manfredonia, and 92 E.N.E. of Naples.

SALPINGO-PHARYNGEUS. In myology. (From *salpinx*, a trumpet, in consequence of its form and phalynx, the organ to which it is attached.) This muscle is composed of a few fibres of the palato-pharyngeus, which it assists in dilating the mouth of the Eustachian tube.

SALPINGO-STATHILINUS. See LEVATOR PALATI.

SALPINGO-STAPHILINUS INTERNUS. See LEVATOR PALATI.

SALSAMENTA'RIOUS. *a.* (*salsamentarius*, Latin.) Belonging to salt things.

SALSETTE, an island of Hindustan, lying off the coast of Concan, to the N. of Bombay, from which it is separated by a narrow channel. It is about 15 miles square, and fertile in rice, fruits, and sugar-canes. It has subterraneous, temples cut out of the rock, in the manner of

those of Elephanta. In 1773, the English conquered it from the Mahrattas; and it has proved a valuable acquisition to Bombay, which formerly depended on foreign supplies for its subsistence. The chief town is Tanna.

SALSAFY. The root of the purple goat's beard. See TRAGOPOGON PRATENSE.

SALSOA'CID. *a.* (*salsus* and *acidus*, Lat.) Having a taste compounded of saltness and sourness (*Floyer*).

SALSOLA. Kali. Salt-wort. In botany, a genus of the class pentandria, order digynia. Calyx five-parted, capsular at the base; corolless; capsule one-seeded; seed spiral. Twenty-five species, chiefly natives of Siberia, and the south of Europe; two common to our own sea-coasts. The following are the species mostly entitled to notice.

1. S. kali. Herbaceous, decumbent; leaves spinous, rough, subulate; flowers axillary; calyx margined. An annual plant, rising five or six inches, with branches issuing in all directions. Indigenous to our own sea-shores.

2. S. rosacea. Herbaceous; leaves subulate, mucronate; calyx flattened, coloured. An erect annual plant, five or six inches high, indigenous to Asia.

3. S. soda. Herbaceous, spreading, leaves unarmed, long and fleshy. A native of the south of Europe.

4. S. vermiculata. Shrubby; leaves fascicled, round, filiform; the floral ones ovate, acute, fleshy. A perennial plant, indigenous to Spain and Siberia, rising three or four feet high; branches hoary and prickly.

All these, like the different species of salicornia, are employed for obtaining soda or mineral alkali. The collected herbs are often burnt over a trench, being laid for this purpose upon laths placed crosswise; and the fluid which drops into the trench crystallizes imperfectly into a saline substance.

SALSU'GINOUS. *a.* (*salsugo*, Lat.) Saltish; somewhat salt (*Boyle*).

SALT (Common or Culinary). This, in modern chemistry, is denominated muriat of soda, as being a neutral compound consisting of soda and muriatic acid. This salt is one of the most abundant productions of nature, and exists native in much greater quantity than any other neutral salt. The waters of the ocean owe their saltness to it, it is found in a number of mineral springs, and it forms immense strata in the bowels of the earth, or rising on the surface, even to the height of mountains. According as it is produced from these sources, it is named bay or sea salt, and rock-salt. Rock-salt is solid, hard, and more or less transparent, of a white, grey, or reddish colour, sometimes of a bright or deep red, or yellow, and more rarely with spots of blue. Its fracture is foliated or fibrous; generally it is massive but sometimes crystallized in cubes, and its fragments are always of a cubical form. The colours have been supposed to depend on the oxyd or muriat of iron. In general it is pure, and hence its taste is purely saline; but sometimes it is bitter from the presence of foreign salts. There are immense mines of it in different countries. Those of Cracow, in Gallicia, have been long celebrated. It abounds in the east and south of Germany, is found in large quantities in Spain, and likewise in Cheshire, in England. In Africa, Asia, and America, it is not less extensively distributed, forming hills above the surface, or very extensive beds. It is always connected with rocks of secondary formation, and generally with gypsum or sulphat of lime. See the article ROCK-SALT.

From the vast abundance with which this most valuable neutral salt exists in inland brine-springs, and in the sea, it is obvious that it can be obtained in almost any part of the world, and without any great degree of trouble: for all that is necessary is to expose any water containing salt to evaporation, in which case the saline material that is left behind may be made to crystallize, or be reduced to a solid state. Yet from the immense quantity of this substance which is perpetually called for, and of course perpetually manufactured, it is an object of great consequence to determine upon the readiest and cheapest process by which it can be obtained. It is, in truth, an object of great national consequence; and we hence gratefully avail ourselves of Dr. Henry's analysis of the chief varieties of British and foreign salt, printed in the Philosophical Transactions for 1810, as containing by far the most correct and valuable paper upon this subject which has hitherto been offered to the world.

"An opinion", says he, "has for some time past existed, and I believe has been pretty general both in this and other countries, to the disadvantage of British salt as a preserver of animal food; and a decided preference has been given to the salt procured from France, Spain, Portugal, and other warm climates, where it is prepared by the spontaneous evaporation of sea water. In conformity with this opinion, large sums of money are annually paid to foreign nations, for the supply of an article, which Great Britain possesses, beyond almost any other country in Europe, the means of drawing from her own internal resources. It becomes, therefore, of much consequence to ascertain whether this preference of foreign salt be founded on accurate experience, or be merely a matter of prejudice; and in the former case, whether any chemical difference can be discovered, that may explain the superiority of the one to the other.

"The comparative fitness of these varieties of salt for the curing of provision, which has been a subject of much controversy among the parties who are interested, can be decided, it is obvious, in no other way than by a careful examination of the evidence on both sides. Where evidence, however, is doubtful, and where there exists, as in this case, much contrariety of testimony, it cannot be unfair to yield our belief to that which best accords with the chemical and physical qualities of the substances in question. Again, if salt of British production should be proved to be really inferior in chemical purity to foreign salt, it would be important to ascertain, as the basis of all attempts toward its improvement, in what, precisely, this inferiority consists. It seemed desirable, also, to examine whether any differences of chemical composition exist among the several varieties of home-made salt, which can explain their variable fitness for economical purposes.

"Such were the considerations that induced me to undertake an inquiry, which has occupied, for several months past, a large share of my leisure and attention. I began the investigation, wholly uninfluenced by any preconceived opinions on the sub-

ject; and I had no motive to see the facts in any other than their true light, since I have no personal interest, either directly or remotely, in the decision of the question.

"The principal sources of the salt which is manufactured in this country are rock salt, brine springs, and sea water. The first material is confined entirely, and the second chiefly, though not wholly, to a particular district of Cheshire. Of the extent and boundaries of this district, the process of manufacture, and other circumstances interesting to the mineralogist as well as to the chemist, an ample and excellent history has been given by Mr. Henry Holland, in the Agricultural Report of the county of Chester. From his account I shall extract, in order to render some parts of this memoir more intelligible, a very brief statement of the characteristic differences of the several varieties of salt, which are prepared in Northwich, and its neighbourhood.

"In making the stoved or lump salt, the brine is brought to a boiling heat, which, in brine fully saturated, is 226° of Fahrenheit. This temperature is continued during the whole process; and as the evaporation proceeds, small flakey crystals continue to form themselves, and to fall to the bottom of the boiler. At the end of from eight to twelve hours, the greatest part of the water of solution is found to be evaporated; so much only being left, as barely to cover the salt and the bottom of the pan. The salt is then removed into conical wicker baskets, termed barrows; and, after having been well drained, is dried in stoves, where it sustains a loss of about a seventh of its weight.

"On the first application of heat to the brine, a quantity of carbonat of lime, and sometimes a little oxyd of iron, both of which had been held in solution by an excess of carbonic acid, are separated; and are either removed by skimming, or are allowed to subside to the bottom of the pan, along with the salt first formed, and with some sulphat of lime; and are afterward raked out. These two operations are called clearing the pan. Some brines scarcely require them at all, and others only occasionally. The whole of the impurities, however, are not thus removed; for a part subsiding to the bottom, forms a solid incrustation, termed by the workmen pan-scale. The portion of this, which is lowest, acquires so much induration and adhesion to the pan, that it is necessary to remove it, once every three or four weeks, by heavy blows with a pick-axe. These sediments are formed, also, in making the other varieties of salt.

"In preparing common salt, the brine is first raised to a boiling heat, with the double view of bringing it as quickly as possible to the point of saturation, and of clearing it from its earthy contents. The fires are then slackened, and the evaporation is carried on for 24 hours, with the brine heated to 160° or 170° Fahrenheit. The salt, thus formed, is in quadrangular pyramids or hoppers, which are close and hard in their texture. The remainder of the process is similar to that of making stoved salt, except that, after being drained, it is carried immediately to the storehouse, and not afterward exposed to heat, an operation confined to the stoved salt.

"The large grained flakey salt is made with an evaporation conducted at the heat of 130 or 140 degrees. The salt thus formed is somewhat harder than common salt, and approaches more nearly to the cubic shape of the crystals of muriat of soda.

"Large grained or fishery salt is prepared from brine heated only to 100° or 110° Fahrenheit. No perceptible agitation, therefore, is produced in the brine, and the slowness of the process, which lasts from 7 or 8 to 10 days, allows the muriat of soda to form in large, and nearly cubical crystals, seldom however quite perfect in their shape.

"For ordinary domestic uses stoved salt is perfectly sufficient. Common salt is adapted to the striking and salting of provision, which is not intended for sea voyages or warm climates. For the latter purposes, the large grained or fishery salt is peculiarly fitted.

"On the eastern and western coasts of Scotland, and especially on the shores of the Frith of Forth, large quantities of salt are made by the evaporation of seawater. In consequence of the cheapness o fuel, the process is carried on from first to last, by artificial heat, at a temperature, I believe, equal or nearly so to the boiling point, and varying, therefore, according to the concentration of the brine. The kind of salt, chiefly formed in Scotland, approaches most nearly to the character of stoved salt. In some places a salt is prepared, termed Sunday salt; so called, in consequence of the fires being slackened between Saturday and Monday, which increases considerably the size of the crystals.

"I am indebted to Dr. Thomson of Edinburgh (who gave me his assistance with great zeal and alacrity) for an opportunity of examining upwards of twenty specimens of Scotch salt, prepared by different manufacturers. That distinguished chemist, it appears, from a letter which he addressed to me on the subject, was some time ago engaged in experiments on Cheshire salt. The particulars he has lost; and he retains only a general recollection of the facts, which confirms, I am happy to state, the accuracy of the results obtained by my own experiments.

"At Lymington, in Hampshire, advantage is taken of the greater heat of the climate, to concentrate the sea-water by spontaneous evaporation to about one-sixth its bulk, before admitting it into the boilers. One kind of salt is chiefly prepared there, which most nearly resembles in grain the stoved salt of Cheshire. The process varies a little in some respects, from that which has been already described. The salt is not fished (as it is termed) out of the boiler, and drained in baskets; but the water is entirely evaporated, and the whole mass of salt taken out at once, every eight hours, and removed into troughs with holes in the bottom. Through these it drains into pits made under ground, which receive the liquor called bittern or bitter liquor. Under the troughs, and in a line with the holes, are fixed upright stakes, on which a portion of salt, that would otherwise have escaped, crystallizes, and forms, in the course of ten or twelve days, of each stake, a mass of sixty or eighty pounds. These lumps are called salt cats. They bear the proportion to the common salt, made from the same brine, of 1 tun to 100.

"From the mother brine, or bitter liquor, which has drained into the pits, the sulphat of magnesia is made during the winter season, when the manufacture of salt is suspended, in consequence of the want of the temperature, required for the spontaneous evaporation of the sea-water. The process is a very simple one. The bitter liquor from the pits is boiled for some hours in the pans, which are used in summer to prepare common salt; and the impurities which rise to the surface are removed by skimming. During the evaporation, a portion of common salt separates; and this, as it is too impure for use, is reserved for the purpose of concentrating the brine in summer. The evaporated

bitter liquor is then removed into wooden coolers 8 feet long, 5 feet wide, and 1 foot deep. In these it remains twenty-four hours, during which time, if the weather prove clear and cold, the sulphat of magnesia, or Epsom salt, crystallizes at the bottom of the coolers, in quantity equal to about one-eighth of the boiled liquor. The uncrystallizable fluid is then let off through plugholes at the bottom of the coolers; and the Epsom salt, after being drained in baskets, is deposited in the storehouse. This is termed single Epsom salts; and after solution, and a second crystallization, it acquires the name of double Epsom salts. Four or five tuns of sulphat of magnesia are produced from a quantity of brine, which has yielded 100 tuns of common, and 1 tun of cat salt.

"On the banks of the Mersey, near its junction with the Irish Channel, the water of that river before evaporation is brought to the state of a saturated brine by the addition of rock salt. The advantage of this method of proceeding will be obvious, when it is stated, that 100 tuns of this brine yield at least 23 tuns of common salt, whereas from the same quantity of seawater, with an equal expenditure of fuel, only 2 tuns 17 cwt. of salt can be produced.

"Within the few past years, an attempt has been made to apply rock salt itself to the packing of provision. For this purpose it is crushed to the proper size between iron rollers. The trials which have been made, I am informed, are but few, and the results hitherto are not perfectly known.

"The bay salt imported from foreign countries is well known to be prepared by the spontaneous evaporation of seawater, which, for this purpose, is confined in shallow pits, and exposed to the full influence of the sun and air. I have no addition to make to the accounts of its manufacture, which have already been given by various writers.

"As the results of the investigation, which forms the subject of this memoir, may be acceptable to many persons, who can scarcely be expected to take an interest in a long detail of analytical processes, I shall present under the following head a general view of the experiments, and of the conclusions that may be deduced from them. In the last place, in order that other chemists may be enabled to repeat the analyses under similar circumstances, I shall describe minutely the methods that were adopted, some of which are new, and others reduced to greater precision. If however, in the future progress of science, it should appear that any of these processes are imperfect, it may still be admitted, that for all useful purposes, they afford a fair comparison of the composition of the several varieties of culinary salt; since the sources of fallacy, that may hereafter be discovered, must have been the same in every case, and have produced in each an error of nearly the same amount.

"*General Statement of the Results of the Experiments, and Conclusions that may be deduced from them.*

"A comparison of the component parts of British and foreign salts, and of different varieties of British salt with each other, will best be made by an examination of the following table, which comprehends the results of the analysis of equal weights of each variety.

1000 parts by weight consist of

	Kind of salt.	Insol mat-ter.	Muriat of lime.	Muriat of mag-nesia.	Total earthy mu-riats.	Sulph. of lime.	Sulph. of magne-sia.	Total sul-phats.	Total impu-rities.	Pure muriat of soda.
For. bay salt.	St. Ube's	9	a trace	3	3	23½	4½	28	40	960
	St. Martin's	12	—	3½	3½	19	6	25	40½	959½
	Oleron	10	—	2	2	19½	4¼	23¾	35¾	964¼
Brit. salt from salt water.	Scotch (common)	4	—	28 or +	28 or +	15	17½	32½	64½	935½
	Scotch (Sunday)	1	—	11½	11½	12	4½	16½	29	971
	Lymington (common)	2	—	11	11 or +	15	35	50	63	937
	Ditto (cat)	1	—	5	5	1	5	6	12	988
Cheshire salt.	Crushed rock	10	0·1/13	0·3/16	0·¼	6½	—	6½	16¾	983¼
	Fishery	1	0·¼	0·¾	1	11¼	—	11¼	13¼	986¾
	Common	1	0·¼	0·¾	1	14½	—	14½	16½	983½
	Stoved	1	0·¼	0·¾	1	15½	—	15½	17½	982½

"I. The total amount of impurities, and the quantity of real muriat of soda, contained in each variety of common salt, may be learned by inspecting the last two columns of the table. From these it appears, that the foreign bay salt is purer, generally speaking, than salt which is prepared by the rapid evaporation of seawater; but that it is contaminated with about three times the amount of impurities discoverable in an equal weight of the Cheshire large-grained salt, and with more than twice those that are found in the stoved and common salt of the same district.

"II. The insoluble matter in the foreign salt, after the action of boiling water, appears to be chiefly argillaceous earth coloured by oxyd of iron; and is probably derived in part from the pits, in which the seawater is submitted to evaporation. We may, perhaps, assign the same origin to the very minute portion of muriat of lime, which is not found in the salt prepared by evaporating seawater in metallic vessels, or even in the mother liquor, or uncrystallizable residue. In sea salt prepared by rapid evaporation, the insoluble portion is a mixture of carbonat of lime with carbonat of magnesia, and a fine silicious sand; and in the salt prepared from Cheshire brine, it is almost entirely carbonat of lime. The insoluble part of the less pure pieces of rock salt is chiefly a marly earth, with some sulphat of lime. The quantity of this impurity, as it is stated in the table, is considerably below the average, which in my experiments has varied from 10 to 45 parts in 1000. Some estimate of its general proportion, when ascertained on a larger scale, may be formed from the fact, that government, in levying the duties, allows 65lb. to the bushel of rock salt, instead of 56lb., the usual weight of a bushel of salt.

"III. The earthy muriats, and especially that with base of magnesia, abound most in salt which is prepared by the rapid evaporation of seawater.

Now since common salt, in all its forms, contains, as will afterward appear, very little water of crystallization, it is probable, that the muriat of magnesia, discovered by the analysis of seasalt, is derived entirely from that portion of the mother liquor which adheres to the salt after being drained, and which amounts to about one-seventh of its weight. The larger the size of the grain, the less is the quantity of this solution, which the salt holds suspended; and hence the salt prepared at a lower degree of heat, being in larger crystals, is less debased by the magnesian muriat, than the salt formed at a boiling temperature. It is probable also, that, when the salt is drawn at intervals from the boiler, the proportion of the earthy muriat will vary with the period of the evaporation, at which it is removed. For it may be readily conceived, that as the proportion of the earthy muriats in any brine is increased by the separation of muriat of soda, the greater will be the quantity of these muriats, which the crystals of common salt, formed in the midst of the brine, will retain. It follows therefore, that, so far as the earthy muriats only are concerned, salt must diminish in purity as the process of evaporation advances.

"In the several varieties of Cheshire salt, the earthy muriats do not exceed one-thousandth part of their weight, and they are precisely (or nearly so, that the difference is not ascertainable) the same in all. This will cease to be matter of surprise, when it is considered, that the salt obtained by evaporating to dryness the whole of a portion of Cheshire brine does not give more than 5 parts of earthy muriats in 1000. In the entire salt of seawater, according to Bergman, the earthy muriats form no less than 213 parts in the same quantity.

"According to the proportion in which the earthy muriats are present in any kind of salt, will be its power of deliquescence, or of attracting moisture from the atmosphere. It is not entirely, however, from the salts with earthy base, that common salt derives this quality; for the most transparent specimens of rock salt, which I find to consist of absolutely pure muriat of soda, attract much moisture from a humid atmosphere.

"IV. The sulphat of magnesia and the sulphat of lime both enter into the composition of all the varieties of salt prepared from seawater; but the sulphat of lime alone is found in Cheshire salt. The proportion of sulphat of magnesia is greatest in that variety of seasalt which has been formed by rapid evaporation. In foreign bay salt, its quantity is very insignificant.

"From the table it may be seen, that the proportion of sulphat of lime is greater in foreign bay salt than in any variety of British salt, even than in those which are prepared from seawater with a boiling heat. The only explanation of this fact that occurs to me is, that, during the rapid evaporation of seawater, a considerable part of the calcareous sulphat is precipitated at an early stage of the process, and is partly removed in clearing the boiler; a process which can scarcely be performed during the formation of bay salt in pits, the sides of which are composed of moist clay. The remainder of the selenite thus precipitated by the rapid evaporation of seawater enters into the composition of the pan scale.

"In the course of this inquiry, I was induced to repeat the same experiments several times, on various specimens of salt, bearing the same designation; and was surprised to find, that the results by no means corresponded. In one instance, for example, fishery salt was found in 1000 parts to contain no less than 16 parts of sulphat of lime; while another specimen, nominally the same, contained only 11¼ parts of selenite in the same quantity; and a third only 5¾. At length it occurred to me, that these differences were probably owing to the circumstance of the salt having been taken from the boiler at different periods of the evaporation. I requested, therefore, to be furnished with specimens of salt drawn at different stages of the process, from a given portion of brine, evaporated in the same boiler. These were submitted to analysis; and the results are shown in the following table.

	Contained in 100 parts.
Common salt drawn from the boiler, 2 hours after the first application of heat	Sulphat of lime. 16
Salt drawn 4 hours after do. ..	11
Salt drawn 6 hours after do. ..	3½

"Hence it appears, that there was a gradually increasing purity in the salt from sulphat of lime, as the process of evaporation advanced; the greatest part of this earthy compound being deposited at an early stage of the process. Different specimens of the same kind of salt may, therefore, differ in chemical purity as much from each other, as from other varieties. But when the impurities, contained in a solution of muriat of soda, are of a different species from those of Cheshire brine, and consist chiefly of the earthy muriats, the order will be reversed, and the purest salt, as I have already suggested, will be that which is first deposited; the contamination with the muriat of lime or of magnesia continuing to increase, as the process advances to a conclusion.

"At an early period of the inquiry it appeared to me probable, that the differences between the several varieties of culinary salt might depend, in some degree, on their containing variable proportions of water of crystallization. It was found, however, by experiment, that the proportion of water in any variety of common salt, after being dried at 212° Fahrenheit, is not much greater or less than that which is contained in any other variety. Pure transparent rock salt, calcined for half an hour in a low red heat (=4° or 5° of Wedgwood's pyrometer), lost absolutely nothing of its weight. It is remarkable, also, that the pure native salt, if free from adventitious moisture, may be suddenly and strongly heated, with scarcely any of that sound called decrepitation, which is produced by the similar treatment of all the varieties of artificial salt. Even these varieties, however, exposed during equal times to a low red heat, do not lose more than from half a grain to three grains in one hundred. This comparison cannot be extended to the salt prepared at a boiling temperature from seawater; because the muriat of magnesia, which these varieties contain, is decomposed at a red heat, and deprived of its acid.

"The following table shows the quantity of water contained in several kinds of salt, inferred from the loss which they sustain by ignition during equal times, after being first dried at 212°.

100 parts of large grained fishery salt contain of water	
100 parts of foreign bay salt (St. Martin's)	
100 parts of foreign bay salt (Oleron)	2½
100 parts of Cheshire common salt	1¼
100 parts of Cheshire stoved salt	0½

"The loudness and violence of the decripitation was, as nearly as could be judged, in the same or-

der, and was most remarkable in the large grained varieties.

"To determine the proportions of real muriat of soda in those varieties of artificial salt which are nearly free from earthy muriats, I employed also the process of decomposition by nitrat of silver. The following are the quantities of fused luna cornea, obtained from 100 grains of each of three varieties dried, previously to solution, at the temperature of 212° Fahrenheit.

100 gr. pure transparent rock salt gave of luna cornea	242
100 gr. stoved salt, remarkably pure	239
100 gr. fishery salt, ditto	237

"The proportion of ingredients in the several kinds of muriat of soda (setting apart the impurities) appears, therefore, to be nearly the same in all. And as the very minute quantity of water, discovered by analysis, is not constant in the several varieties, it may be inferred to be rather an accidental than a necessary ingredient: for in the latter case an invariable proportion might be expected, conformably to the important law, establishing a uniformity in the proportions of chemical compounds, which has been explained by Mr. Dalton, and confirmed by Drs. Thomson and Wollaston.

"What then, it may be inquired, is the cause of those differences, which are acknowledged, on all hands, to exist among the several species of muriat of soda, so far as respects their fitness for economical purposes? If I were to hazard an opinion, on a subject about which there must still be some uncertainty, it would be, that the differences of chemical composition, discovered by the preceding train of experiments, in the several varieties of culinary salt, are scarcely sufficient to account for those properties, which are imputed to them on the ground of experience. The stoved and fishery salt, for example, though differing in a very trivial degree as to the kind or proportion of their ingredients, are adapted to widely different uses. Thus the large grained salt is peculiarly fitted for the packing of fish and other provision, a purpose to which the small grained salts are much less suitable. Their different powers then of preserving food must depend on some mechanical property; and the only obvious one is the magnitude of the crystals, and their degree of compactness and hardness. Quickness of solution, it is well known, is pretty nearly proportional, all other circumstances being equal, to the quantity of surface exposed. And since the surfaces of cubes are as the squares of their sides, it should follow, that a salt, the crystals of which are of a given magnitude, will dissolve four times more slowly than one, the cubes of which have only half the size.

"That kind of salt then which possesses most eminently the combined properties of hardness, compactness, and perfection of crystals, will be best adapted to the purpose of packing fish and other provision; because it will remain permanently between the different layers, or will be very gradually dissolved by the fluids, that exude from the provision; thus furnishing a slow, but constant supply of saturated brine. On the other hand, for the purpose of preparing the pickle, or of striking the meat, which is done by immersion in a saturated solution of salt, the smaller grained varieties answer equally well; or, on account of their greater solubility, even better.

"With the hardness or strong aggregation of the several varieties of salt, it seemed to me not improbable, that their specific gravity might, in some degree, be connected. The exact determination of this property in saline substances is, however, a problem of considerable difficulty, as will sufficiently appear from the various results which have been given, with respect to the same salts, by different experimentalists. Thus Muschenbroek makes the specific gravity of artificial muriat of soda to vary from 1918, to 2148, the mean of which is 2033. Sir Isaac Newton states it at 2143, and Hassenfratz at 2200. All that was necessary for my purpose was an approximation to the truth; and the introduction of a small error could be of no importance, provided it were the same in every case, since the comparison would still hold good.

"The specific gravity of rock salt there can be little difficulty in determining with precision. A piece of this salt, of such perfect transparency, that I had reserved it as a cabinet specimen, weighed in the air 513 grains, and lost, when weighed in alcohol, 194 grains. The alcohol, at the temperature of 56° Fahrenheit, had the specific gravity of 820, and hence that of the salt may be estimated at 2170. Another specimen considerably less pure, and more approaching to a fibrous fracture, had the specific gravity of 2125 only.

"For ascertaining the specific gravities of artificial varieties of salts, I used a very simple contrivance. It consisted of a glass globe about 3½ inches diameter, having a stem or neck 10 inches long. Sixteen cubic inches of water (each 252½ grains at 60° Fahrenheit) filled the whole of the globe, and about half an inch of the lower part of the neck; and from the line where the water stood in the instrument, it was accurately graduated upwards into hundreth parts of a cubical inch. Into this vessel I poured exactly sixteen cubic inches of a perfectly saturated solution of common salt; and then added 400 grains of the salt under examination, washing down the particles that adhered to the neck by a portion of the liquid, which had been previously taken out of the globe for the purpose. As much as possible of the air which adhered to the salt was dislodged by agitation; and the increase of bulk was then observed.

"Care was taken, that the salts were all of equal temperature and dryness, and that no change of temperature happened during the experiment.

	Hundrs. of a cub. inch.	Hence its specific grav. was
400 gr. of the less pure kind of rock salt, broken down into small fragments, filled the space of	75	2112
400 gr. of stoved salt	75	2112
400 gr. (another sample)	76	2084
400 gr. common salt	76	2084
400 large gr. fishery salt	83	1909
400 large gr. (another sam.)	83	1909
400 large gr. St. Ube's	82	1932

"If the above mode of determination at all approach to correctness, it would appear, that the specific gravity of rock salt is diminished, by being broken into small fragments, from 2125, to 2112, probably in consequence of the quantity of air which the fragments envelope, and which cannot be entirely separated by agitation. From the numbers given in the last column, it is evident, that the smaller grained salts are specifically heavier than those which are composed of larger and more perfect crystals. A difference of only one or two hundredth parts of a cubic inch is perhaps entitled, in a process of this kind, to little reliance; and I do

not therefore regard it as indictaing any material difference in the specific gravity of the first four, or last three salts submitted to experiment. But when the difference amounts to eight hundredths, as between the small and large grained salt, it may safely be imputed to an inferior specific gravity in that species, which occupies so much greater a proportional bulk.

"The last series of experiments proves decisively, that in an important quality (viz. that of specific gravity), which is probably connected with the mechanical property of hardness and compactness of crystals, little or no difference is discoverable between the large grained salt of British, and that of foreign manufacture. If no superiority, then, be claimed for British salt, as applicable to economical purposes, on account of the greater degree of chemical purity, which unquestionably belongs to it, it may safely, I believe, be asserted, that the larger grained varieties are, as to their mechanical properties, fully equal to the foreign bay salt. And the period, it is hoped, is not far distant, when a prejudice (for such, from the result of this investigation, it appears to be) will be done away, which has long proved injurious to the interests and prosperity of an important branch of British manufacture.

"*Account of the Methods of Analyzing the several Varieties of Muriat of Soda.*

"The method of analysis, which I adopted, in examining the several varieties of muriat of soda, was as follows.

"When the salt was in a state of solution, a measured quantity was evaporated to dryness in a sand heat, which was carefully regulated, to avoid the decomposition of the muriat of magnesia, if any of that salt were present in the solution.

"Each specimen of salt was reduced to a fine powder, and was dried, in the temperature of 180° of Fahrenheit, during the space of two hours. This was done in order that the different experiments might be made on precisely equal quantities of salt.

"I. *To separate the earthy Muriats.*

"(A.) On 1000 grains of the dried and pulverized salt (except in the case of the foreign salts, when only 500 grains were used), four ounce measures of alcohol were poured, of a specific gravity, varying from 815 to 820, and at nearly a boiling temperature. To insure the access of the fluid to every part of the salt, they were ground together for some time in a mortar, and then transferred into a glass mattrass, where they were digested for some hours, and frequently agitated. The alcohol was next separated by filtration, and the undissolved part was washed, as it lay on the filtre, with four ounce measures of fresh alcohol.

"(B.) The united washings were evaporated to dryness, and to the dry mass a small portion of fresh alcohol was added, to separate the earthy muriats from a little common salt, which had been dissolved along with them. This second solution might, however, still contain a minute portion of muriat of soda. It was therefore again evaporated, re-dissolved in hot water, and mixed with a solution of carbonat of soda. By boiling for some minutes, the whole of the earths were precipitated, and after being well washed, were redissolved in muriatic acid. This solution, being evaporated to dryness, gave the weight of the earthy muriats, which had been extracted by alcohol.

"(B. a.) The dry mass thus obtained might consist either of muriat of magnesia, or muriat of lime, or of both. An aliquot part, therefore, was dissolved, separately, for the purpose of assaying it by the usual tests. Sometimes, as in the case of the earthy muriats procured from sea salt, muriat of magnesia alone was indicated, and any farther process was rendered unnecessary. Muriat of lime was in no instance found uncombined; but in the majority of cases (as in the earthy muriats obtained from Cheshire salt) was mixed with muriat of magnesia.

"(B. b.) To the solution of the two earthy muriats was added fully saturated carbonat of ammonia, which has the property of throwing down lime in combination with carbonic acid, but has no effect on the muriat of magnesia at ordinary temperatures. The solution of the latter salt, along with that of the excess of carbonat of ammonia, was therefore seperated by filtration; and to the filtered liquor a solution of phosphat of soda was added, according to the formula of Dr. Wollaston.

"(B. c.) By direct experiments I had learned, that 100 grains of muriat of magnesia, when thus decomposed by carbonat of ammonia, conjoined with phosphat of soda, give 151 grains of insoluble ammoniaco-magnesian phosphat dried at about 90° of Fahrenheit. Hence it was easy, from the weight of the precipitate, to calculate how much of the former salt was contained in the mixture of muriat of lime and muriat of magnesia. Thus, if 20 grains of a mixture of the two muriats yielded 15·1 of ammoniaco-magnesian phosphat, it is obvious, that the mixture must have consisted of equal weights of muriat of lime and muriat of magnesia.

"(B. d.) The estimation of the proportion of muriat of lime, in a mixture of this salt with muriat of magnesia, was sometimes performed in a different way. To a cold solution of a known weight of the two salts, superoxalat of potash was added; and the precipitate was collected, washed, and dried at about 160° Fahrenheit. Of this precipitate I had previously found, that 116 grains are formed by the decomposition of 100 grains of dry muriat of lime. From the quantity of oxalat of lime it was easy, therefore, to infer that of the muriat, from the decomposition of which it resulted; and this, subtracted from the weight of the two salts gave the weight of the muriat of magnesia.

"II. *To separate and estimate the earthy Sulphats.*

"(C.) The portion of salt, which had resisted the action of alcohol, was dissolved by long boiling in sixteen ounce measures of distilled water, and the solution was filtered. On the filtre a small quantity of undissolved matter generally remained, which was washed with hot water, till it ceased to have any action. The weight of the insoluble portion was then ascertained.

"(C. a.) By this operation were dissolved not only the muriat of soda, but all the other salts insoluble in alcohol, which might be mingled with it. To the solution carbonat of soda was added; and the liquid, which in most cases gave, on this addition, an abundant precipitate, was boiled briskly for several minutes, in order that none of the earthy carbonats, which were separated, might remain dissolved by an excess of carbonic acid.

"(C. b.) The precipitated earths were allowed to subside, and were well edulcorated with boiling water, the washings being added to the liquor first decanted from the precipitate. To these united

liquids (after the addition of more muriatic acid than was required for saturation) muriat of barytes was added, till it ceased to occasion any farther precipitate. The sulphat of barytes was then washed sufficiently; dried, ignited, and its amount ascertained.

"To the earthy carbonats an excess of sulphuric acid was added in a platina dish, and the mixture was triturated, till all effervescence ceased. It was then evaporated to dryness, calcined in a low red heat, and the weight of the earthy sulphats was ascertained.

"(D. a.) The dry sulphats were washed with a small quantity of lukewarm water. In several instances, the loss of weight, thus sustained, was extremely trifling, nothing being dissolved but a very minute portion of sulphat of lime, of which earthy salt, solely, the residue was presumed to be composed.

"(D. b.) But in other cases, a considerable loss of weight ensued; and in these, to the watery solution was added a mixture of equal parts of saturated solutions of carbonat of ammonia and phosphat of soda. A precipitate more or less copious was produced, which was collected, dried at 90° Fahrenheit, and weighed.

"(D. c.) By direct experiments I had determined, that 90 grains of this precipitate result from the decomposition of 100 grains of sulphat of magnesia, of such a degree of dryness, as to lose 44 grains out of 100, by exposure to a low red heat. Hence 100 grains of ammoniaco-magnesian phosphat indicate 111 grains of crystallized, or 62·2 of desiccated sulphat of magnesia. From the weight of the ammoniaco-magnesian phosphat, it was easy, therefore, to infer the proportion of sulphat of magnesia in any mixture of the two earthy sulphats.

"(D. d.) It was possible, however, that, in addition to the sulphats of lime and of magnesia, the quantity of which had been determined by the foregoing process, the specimen of salt under examination might contain also an alkaline sulphat. To decide this point, it was necessary to compare the amount of the acid, deducible from the weight of the sulphat of barytes (C. b.) with that which ought to exist in the sulphat of lime and sulphat of magnesia, actually found by the experiment. But, to make this comparison, some collateral experiments were previously necessary.

"(D. e.) By these experiments I found, that sulphat of lime prepared by double decomposition, then calcined in a low red heat, and afterward dissolved in a large quantity of boiling distilled water, yields, when precipitated by a barytic salt, in the proportion of 175·9 grains of sulphat of barytes from 100 of the calcareous sulphat. The same quantity of ignited sulphat of lime (= 128 grains dried at 160° Fahrenheit,) precipitated by superoxalat of potash, gives 102·5 of oxalat of lime; or, precipitated by subcarbonat of potash at a boiling heat, 74·3 grains of carbonat of lime. One hundred grains of crystallized sulphat of magnesia (= 56 desiccated) afford, when precipitated by muriat of barytes, 111 or 112 of earytic sulphat.

"(E.) By a comparison of the above proportions with those obtained in the analyses of any specimen of common salt, we may learn whether it contain other sulphats beside those with earthy bases. For example, if the precipitate (D.) consist of carbonat of lime only, and bear to the sulphat of barytes (C. b.) the proportion of 74 to 175, or very nearly so, we may infer, that no other sulphat is present, but that of lime. The same conclusion will follow, if, after having decomposed one half of the watery solution (C.) by muriat of barytes, and another half by potash, we find that the sulphat of barytes bears to the oxalat of lime the proportion of 175·9 to 102·5. Now these proportions were, as nearly as could be expected, obtained in the analysis of Northwich salt; whence we may conclude, that the only sulphat, which it contains, is gypsum, or the sulphat of lime.

"It must be remembered, however, that the calcareous sulphat, contained in any variety of common salt, cannot be in a state of complete desiccation, but would lose 22 parts out of 100, by exposure to a red heat. It becomes necessary, therefore, either to increase, in the proportion of 5 to 4, our estimate of the sulphat of lime obtained by the foregoing rule, or, more simply, to assume, that 100 grains of sulphat of barytes indicate 73 grains of sulphat of lime, dried at 160° Fahrenheit, = 57 ignited.

"(F.) When sulphat of lime and sulphat of magnesia were both ascertained, and other sulphats also might possibly be present, as in the varieties of salt from sea water, the calculation became a little more complicated. In this case, after determining the quantity of both sulphats, (by the processes D. &c.) I estimated how much sulphat of barytes they ought respectively to afford; and then compared the estimated quantity with that which was actually obtained. The earthy carbonats, for example, precipitated from 1000 grains of Lymington salt, which had previously been digested with alcohol, were converted into 31 grains of calcined sulphats, consisting of 19 grains of dry sulphat of magnesia, and 12 grains of dry sulphat of lime. Now from the magnesian sulphat 38 grains of sulphat of barytes should result; and from the sulphat of lime 21 grains; the sum of which is 59. But the quantity actually obtained was 59·8. There is only, therefore, an excess of 0·8 grain of the actual above the estimated quantity, a difference much too trivial to be admitted an indication of any sulphat with an alkaline base; and arising, probably, from unavoidable errors in the experiment.

"(F. a.) If in any mixture of salts, free from the earthy muriats, we are certain that no other sulphats exist beside those of lime and magnesia, their estimation becomes extremely simple. Decompose two equal quantities of the salt in question, the one by muriat of barytes, the other by oxalat of potash. From the weight of the latter precipitate we may calculate the quantity of sulphat of lime. Suppose, for example, the oxalat of lime (as was actually the case with the precipitate from 1000 grains of Lymington salt), to weigh 12 grains: these denote 15 of sulphat of lime, dried at 160° Fahrenheit; which quantity, if decomposed, would give 20½ of sulphat of barytes. The latter number (20½), subtracted from the weight of sulphat of barytes actually obtained (say 60) gives 39½ grains for the sulphat of barytes resulting from the decomposition of the sulphat of magnesia. The quantity of the latter salt, it will be found, therefore, by applying the rule already given (D. e.) must be 35 grains.

"(F. b.) The same object may be accomplished by decomposing two equal quantities, the one by oxalat of potash, the other by the compound solution (D. c.). From the weights of the precipitates

it is easy to calculate from how much of the calcareous and magnesian sulphats they have resulted.

"(G.) When the salt left by alcohol was known to contain muriat of soda, and sulphat of magnesia, but no sulphat of lime, the presence of alkaline sulphats was investigated in the following manner. The salt was dissolved in water, and the solution was divided into two equal portions. To the one muriat of barytes was added, and to the other, the compound precipitant of carbonat of ammonia, and phosphat of soda. If the sulphat of barytes, thus produced, bore to the ammoniaco-magnesian phosphat the proportion of 112 to 90, it was concluded that no other sulphat had been decomposed, but that with base of magnesia.

"(H.) At one time, I expected to have ascertained the quantity of sulphat of soda, in an artificial mixture of that salt with sulphat of magnesia and muriat of soda, by the following formula. To a solution of the three salts, heated to a boiling temperature, I added subcarbonat of ammonia, which decomposes the sulphat of magnesia only. I had then a solution containing muriat and sulphat of soda, with sulphat of ammonia, and some carbonat of ammonia. This solution was evaporated to dryness, and the mass was sufficiently heated to expel the ammoniacal salts. I found, however, that at this temperature the sulphat of ammonia acted upon the muriat of soda, and produced an additional, and not inconsiderable quantity of sulphat of soda.

"Having determined, by the foregoing processes, the quantity and kind of the earthy muriats, the amount of the insoluble matter, and the proportion of sulphats, the weights of all these different impurities were added together; and, the sum being deducted from the weight of the salt submitted to experiment, the remainder was assumed as the amount of the pure muriat of soda in the specimen under examination.

"Though I purposely refrain from giving the details of the several analyses, which were made according to the foregoing plan, from the conviction that they would be both tedious and unnecessary, yet there are a few circumstances, which it may be proper to mention more fully than can be done in the form of a table.

"1. The brine which I examined was from Northwich, and was sent me in the state in which it was taken from the spring. At the temperature of 56° Fahrenheit, it had the specific gravity of 1205. It was perfectly limpid, but lost a little of its transparency when raised to a boiling heat, in consequence of the deposition of a very minute quantity of carbonat of lime, and oxyd of iron. It was immediately precipitated by muriat of barytes, oxalat of ammonia, and alkaline solutions, both mild and caustic. Eight ounce measures, evaporated to dryness in a sand heat, gave 1230 grains of salt, which, for the sake of distinction, I term entire salt. It proved, on analysis, to contain in one thousand parts,

Carbonat of lime and oxyd of iron	2
Muriat of lime, and muriat of magnesia, in nearly equal proportions	5
Sulphat of lime	19
Muriat of soda	974
	1000

"2. The mother liquor, or brine that remains after separating all the common salt, which it is thought worth while to extract, had the specific gravity of 1208. The dry salt contained

Muriat of magnesia	35
Muriat of lime	32
Sulphat of lime	6
Muriat of soda	927
	1000

"3. The clearings of the brine, which are raked out of the pan when the salt first begins to granulate, contained in 1000 parts,

Muriat of soda	800
Carbonat of lime	41
Sulphat of lime	159
	1000

"4. Of the substance called by the workmen pan-scale two specimens were analysed, the one containing a large proportion of muriat of soda, the other very little. The first variety consisted of

Muriat of soda	950
Carbonat of lime	10
Sulphat of lime	40
	1000

The second variety was composed of

Muriat of soda	100
Carbonat of lime	110
Sulphat of lime	790
	1000

"Circumstances, however, are constantly occurring, to vary the proportion of ingredients, both in the clearings and in the pan-scale. If, for example, the brine be short of the point of saturation with common salt, it acts, when admitted into the pan, upon the muriat of soda which the pan-scale contains, and we obtain the second variety. But if the brine be fully charged with salt, it affects no solution of the muriat of soda carried down along with the gypsum; and then the first species of pan-scale results.

"5. The salt oil, or mother liquor from seawater, a specimen of which I received from Dr. Thomson, had the specific gravity of 1277. It was abundantly precipitated by muriat of barytes; by pure ammonia, but not by the carbonat; and was not changed by oxalat of potash, either immediately or after an interval of some hours. One thousand parts of the dry salt consisted of

Muriat of magnesia	874
Sulphat of magnesia	70
Muriat of soda	56
	1000

"6. The salt brine, or liquor which drains from the Scotch salt, had the specific gravity of only 1188. It was affected by the same tests as the salt oil, but less remarkably. The dry residue contained

Muriat of magnesia	205
Sulphat of magnesia	135
Muriat of soda	660
	1000

"7. The mother liquor, or bittern, from Lymington, presented, on analysis, an unaccountable variation from the similar fluid sent from Scotland, and gave a much larger proportion of sul-

phat of magnesia. A considerable quantity of this salt had, moreover, crystallized in the bottle which contained the liquid. Its specific gravity was 1280. One thousand parts of the dry salt contained of

Muriat of magnesia	640
Sulphat of magnesia	260
Muriat of soda	100
	1000

"8. The pan-scale from Lymington contained

Muriat of magnesia	29
Desiccated sulphat of magnesia	18
Carbonats of lime and magnesia	127
Sulphat of lime	216
Muriat of soda	610
	1000

"From the very near approximation of the proportions between the sulphat of barytes and ammoniaco-magnesian phosphat, obtained in the analysis of all these products of seawater, to those which result from the decomposition of two equal quantities of sulphat of magnesia, it may be inferred, that they contain no sulphat of soda. For example, to decide whether the Scotch salt contains an alkaline sulphat, or not, I dissolved 1500 grains in a pint of boiling water, and evaporated till fourteen drachm measures only remained, the common salt being removed as soon as it was formed. The residuary liquid was divided into two equal portions, one of which gave 18½ grains of sulphat of barytes, and the other 14 grains of ammoniaco-magnesian phosphat. The proportion between these numbers is so nearly that which has been already assigned, (viz. 112 to 90) that we may safely infer the total absence of sulphat of soda. This salt, indeed, is considered as incompatible with muriat of magnesia; but after digesting, for two or three days, 100 grains of the former, with 20 of the latter, evaporating to dryness, and washing the residuum with repeated effusions of alcohol, I found that two grains of the muriat of magnesia had escaped decomposition."

SALTS. Saline substances. It is a difficult matter, in a work intended for popular use, to explain the exact meaning of this term, and it is perhaps most correct as well as easiest to affirm that, except in the very restrained and new sense in which it is used in the chemistry of the present day, it has never had any very exact meaning at all.

In order, however, to comprehend the different senses in which it has been employed by different physical philosophers and annalysts, we shall take a brief survey of the history of the term, and the uses to which it has been applied under different systems.

The term *salt* seems at first to have been simply restricted to the material which we have just described under the name of culinary or common salt, or muriat of soda; the more obvious properties of which are taste and solubility in water. And hence, under the old chemists, every substance which united these two properties were regarded as saline substances. It was soon discovered, however, that this kind of definition would by no means hold; for while taste and solubility in water are qualities of many other bodies than those denominated saline, as, for example, all mucilages, whether of the vegetable or animal kingdom, these very properties are in many substances properly called saline scarcely or not at all perceptible. Another character was in consequence attempted to be laid down by naturalists, and salts were made to depend upon crystallization and transparency; but it was soon perceived that these qualities also, like the preceding, while absent from many substances properly denominated salts, appertain to a variety of other substances which cannot be ranked under this class.

Hence Macquer, who first attempted to arrange them under a definite as well as a popular system, contended that the limit between saline and unsaline substances was not known; and proposed the following characters, which, till of late years, have been in universal reception, and to which we shall consequently pay due attention. 1. A strong tendency to combination, or a very strong affinity of composition; 2. A greater or lesser degree of sapidity; 3. A greater or lesser degree of solubility in water; 4. Perfect incombustibility.

Before each of these properties is examined singly, it must be observed, that the saline quality of any given body is greater, the more of these properties it possesses, and the greater their intensity. It must not, however, be concluded, that substances are not of a saline nature because these properties are scarcely evident in them; as it may often happen that two species, which possess them in a very small degree, exhibit them still less when they come to be united; and there are likewise instances of the contrary effect taking place. But in these cases, a more varied application of the chemical analysis, or synthesis, may serve to exhibit the saline properties more evidently.

1. *Tendency to combination, as a character of saline substances.*—The greater number of salts have a tendency to combine with many different substances. It is among the salts that the most active bodies, with respect to combination, are found. For this reason the chemists have at all times made great use of them, and have dignified certain salts with the names of solvents and menstrua. This tendency to combination differs greatly in the several species of salts. Some possess it in so intense a degree, that they corrode, dissolve, or destroy every thing they touch, and that even the vitrifiable and quartzose stones cannot withstand their action. Such are several of the pure salts called acids and alkalies. Others, though they do not so strongly tend to combination, nevertheless unite with great readiness to several substances. And, lastly, there are salts which do not possess this property in any sensible degree, as is often observable in compound salts, whose principles have a strong affinity with each other, and are mutually saturated. It is not to be wondered that salts are seldom found in nature in a state of purity, when we attend to the effects of this property, of combining with various substanees.

2. *Of taste, as a character of saline substances.*—Sapidity has hitherto been considered as being so far peculiar to saline substances, that many philosophers have concluded these bodies to possess it exclusively, and that they are the principle of sapidity in all other bodies. Though this opinion is not yet clearly proved, because there are many bodies not at all saline, as, for example, the metals, which have a very sensible taste. But though instances may be urged of certain saline matters which have scarcely any taste, yet it cannot be denied, that the most eminently sapid bodies be-

long to this class: for which reason we have assumed this property as one of the leading characters of salts. The sapidity of saline matters varies, like their other properties, in the different species. In order to determine its origin, and more especially the cause of the differences of its energy, it will be necessary to shew in what it consists. By sapidity is commonly understood an impression made on the organs of taste, by which we determine the good or bad qualities of any substance with regard to salubrity; it is therefore a peculiar action of the sapid body on the nerves of the tongue and palate of animals. But it may be asked, whether this property of bodies enables them to act sensibly on the nerves of the tongue; and whether it may not be equally exerted on all those parts of an animal which contain nerves? They who are acquainted with the animal economy cannot deny, that the action which excites the sensation of taste must produce its effects on any nerves, wheresoever situated; and that it must be proportioned to the sensibility of the subject, and the organs to which it is applied.

In this way of considering sapidity, we are naturally led to conclude, 1. That its impression will be scarcely sensible on such parts of bodies as contain few nerves, or whose nerves do not possess a considerable degree of sensibility on account of their being covered, as on the skin, where they are defended by the reticular membrane and epidermis. It follows, therefore, that the taste of any salt must be very strong and active before it can act sensibly upon the skin. 2. That the impression will be made with much more efficacy on these organs whose nerves are large, numerous, and of a form proper to admit an extended contact, or more violent agitation, and whose epidermis is very thin, so as to leave the nerves almost uncovered.

The superior part of the tongue, the palate, and the whole internal surface of the mouth, are capable of perceiving the taste of a great number of bodies, which make no impression on the less sensible organs of the skin. 3. That bodies which have no taste and no action when applied to the skin, may nevertheless produce a considerable effect on parts more delicately organized, or whose nerves possess a greater degree of sensibility, as is the case of the stomach and intestines. These considerations being admitted, we may distinguish three classes of tastes, and of sapid bodies, to which all saline matters may be referred. The first class comprehends salts of the strongest taste, capable of acting on the skin. The impression of this taste is so strong as to cause very acute pain; and if its action be continued for a certain time, the organization of the skin is entirely destroyed. This taste is causticity; and the salts which possess it are called caustic. The second class comprehends those whose sapidity is of a mean degree of intensity, and is not to be perceived but by the organs of taste. These are commonly distinguished by different names; as, bitter, adstringent, acid, acrid, urinous, &c. In the third class are arranged saline substances whose taste is sensible only in the stomach and intestines. These are not numerous. It is of importance to make some observations on the relations of these several classes of tastes. And, first, it must be observed, that there are many degrees in each of these classes, by which bodies differ from each other in intensity of taste.

Thus, among caustic salts, some act much more strongly than others; the former immediately destroying the organization of bodies, while the latter require a more considerable space of time to produce the same effect. This observation applies likewise to the bitter, adstringent, and urinous salts, as well as to those which have no sensible action but on the nerves of the stomach. In the second place, in considering the diversities of the tastes, we are naturally led to the conclusion, that the several tastes are degrees of the same property, from the most caustic salt, to that whose action is too feeble to be perceived, but on the highly sensible organs of the stomach; and this reflection seems to shew, that all tastes owe their origin to one and the same cause.

To determine the cause of sapidity, it will be proper to consider its strongest degree, that we may better distinguish the phænomena, and deduce its mode of action. The inquiry, therefore, relates to the cause of causticity; a property which has always been a subject of conjecture among chemists. Lemery, observing that very hot bodies are excessively caustic, and likewise that such salts as possess this property have been subjected to a strong degree of heat in their preparation, attributed the property of causticity to the particles of fire, which he supposed to be deposited among the particles of bodies. Mr. Baumé espoused this opinion. Meyer, an apothecary of Osnaburgh, after making a series of inquiries into the nature of caustic salts, constructed an ingenious system, or hypothesis, to which many chemists have been much attached, though at present it is held in no esteem.

This philosopher attributed causticity to a principle which he considered as a compound of fire and a peculiar acid; this he denominated *causticum*, or *acidum pingue*, after the ancient chemists. He pursued this principle through its transitions and combinations, as Stahl had done before with his phlogiston; but his system was defective in the same manner as that of Stahl, as he did not succeed better in proving the existence of his causticum, than Stahl did that of his phlogiston. Dr. Black, whose researches were directed to the same subjects as those of Meyer, gave the finishing stroke to his doctrine, by clearly showing, that the causticity of lime and alkalis, far from being owing to the addition of any principle, as the acidum pingue of Meyer, arises, on the contrary, from the subtraction of an elastic fluid. Macquer is, beyond controversy, the chemist whose inquiries into the cause of causticity have been attended with the greatest success. The doctrine explained by him on this subject, in his Chemical Dictionary, is so clear, and established on such conclusive facts, that it is impossible to forbear assenting to his opinion. After observing that caustic bodies corrode and destroy our organs, by combining with their constituent principles, he remarks, that, in proportion as the combination proceeds, the caustic body by degrees loses its force; and that it ceases to be such, as soon as it has dissolved as much of the animal matter as it is capable of uniting with. Thus it is, that the pure fixed alkali, or lapis causticus, corrodes the skin on which it is applied, and, after a certain time, becomes saturated, and ceases to act. This salt really acts by a chemical force, since it produces its effects on the insensible skin of dead bodies, as M. Poulletier has proved by accurate experiments; and, in general, on all animal substances, which it dissolves. Causticity, therefore, depends on the tendency to combination; and the effect of this force on our organs is merely the result of a com-

bination of the caustic matter with the matter of which the organs are formed, in the same manner as caustic bodies lose their efficacy, when combined with any other substance with which they have a tendency to unite; and, in a word, causticity is always in proportion to the tendency to combination. Hence it is, that the most tasteless salt owes its want of causticity to its being already saturated with some other substance; and its taste will be rendered stronger, in proportion to the more or less complete separation of that substance. All the phænomena of saline bodies are in proof of this assertion.

3. *Solubility as a character of saline bodies.*—Solubility in water has been assumed by all chemists as one of the leading properties of salts. Yet this property, like that of taste, or the tendency to combination, is subject to great varieties. In some salts it is so powerful, that they cannot be deprived of the least portion of water they contain, but by elaborate processes long continued. Others have only a mean degree of solubility, which may be ascertained with considerable accuracy, as is the case with the neutral salts. And lastly, there are certain saline matters which are so little soluble, that they even seem in this respect to belong to the class of earths, and have in fact been considered as such by naturalists. The limits between those two classes of mineral bodies are very difficult to be determined, and chemists are not agreed on this head. Mr. Kirwan, in his mineralogy, appears to have adopted the opinion of Bergman, who thinks that all substances which require more than one thousand parts of water for their solution ought to be ranked among earths; and that all which are more soluble ought to be esteemed as salts. If this proportion should be received among chemists, as it deserves to be, we shall avoid the diversity of opinions and of language which has hitherto prevailed, to the discouragement and hindrance of such as enter into the study of chemistry. There is the same correspondence between the taste and solubility of salts, as there is between this last property and the tendency to combination; for the solubility in water is an immediate consequence of that tendency to combination, and must therefore follow the same laws. It is found that the more taste and activity any salt possesses, the more soluble it is in water; and this general fact depends on their respective nature and properties.

4. *Of incombustibility as a character of saline bodies.*—It is more difficult to acquire a clear idea of this property of saline bodies, than the others we have been speaking of. They have not yet been considered by any chemist in this point of view, and many writers have asserted that some salts, and among them nitre, are truly combustible. To shew the fallacy of this opinion, and to prove that all mineral salts are perfectly incombustible, would require a very intimate knowledge of the properties of these substances. The valuable experiments of M. Lavoisier show, that several combustible bodies form, by their combustion, acids of a particular nature, according to the substance burned.

Combustion is nothing more than a combination of the base of vital air, or oxygen, with combustible bodies. All bodies which have been completely burned, that is to say, which have combined with oxygen in a sufficient quantity to be saturated, enter into the class of incombustible bodies; or, which is the same thing, their tendency to combine with oxygen being satisfied, they are no longer capable of uniting with or absorbing more. These principles being once proved, if, on the one part, it be found that many salts are the residues of various combustible matters which have been burned; and if, on the other part, an entire class of these salts be found to contain oxygen, and to exhibit the characters of substances which have passed through the process of combustion; it will be easily conceived that they cannot continue to be combustible. These assertions are founded on a great number of facts; they prove that salts are compounded substances, most of them being formed by the union of certain combustible bodies with oxygen; and it will be understood with equal facility, that this character of incombustibility may be considered as the most certain and invariable property of saline matters. The proof of these important assertions will appear complete with regard to the class of acid salts, in the details which will constitute the particular history of those substances. There exists, nevertheless, a class of salts which appear evidently to be compounded, and do not contain oxygen, or at least in an inferior degree. Such are the alkalies in general: but they are either composed of matters which are themselves incombustible; or if they contain any combustible substance, as is seen in ammoniac or volatile alkali, it is united to a substance evidently incombustible, which absolutely prevents this property from being sensible in the other substance.

5. *Nature and composition of saline substances in general.*—Stahl, who paid great attention to the nature of saline bodies, was of opinion, that they are formed of water and earth. He collected every fact which was known in his time, and applied them to the illustration of his sublime theory. But that period of improvement has been succeeded by another, in which, by the multiplicity of experiments, and the magnitude of the discoveries concerning the influence of air in chemical phænomena, the theory of salts as invented by Stahl, and explained with great perspicuity by Macquer, is no longer found adequate to the explanation of the nature and compositions of those bodies. We are no longer contented with those distant analogies by which the most discordant facts are united, and which serve only to deceive by their illusive light. It is better to acknowledge our ignorance, than to advance extravagant theories, that must sooner or later be refuted by experiment.

Though the chemical nature of salts is not yet perfectly understood, and the general facts will not permit us to assert that one single principle is the cause and origin of all saline bodies, as many eminent philosophers have thought; yet it must be admitted, that we are better acquainted with their composition than formerly. It is known that they, for the most part, contain a very great quantity of oxygen; and that this fluid is fixed, in combination with combustible matter, of a different nature in the different kinds of salts. There are sufficient proofs that many acids are thus composed; and it may be strongly presumed by analogy, that most of this class of salts are compounded in the same manner. Water, without being one of the immediate principles of salts, is often united, and adheres to them by a very strong attraction. As to the matter of fire, considered as phlogiston, which very great chemists have admitted in salts, there is too much uncertainty at present respecting the nature and even the existence of this matter, to justify the adoption of any decided opinion. It is not the same with calorie,

which appears to form one of the principles of salts, or rather, to exist in a greater quantity in some than in others: such is the general cause of the fluidity, fusibility, and volatility of a great number of saline matters.

The presence of earth in most salts, regarding the term in the sense used by Macquer, is not shown by any direct experiment; it is only known that all native salts are mixed with a greater or less quantity of various earthy substances. But these do not belong to them; they do not, properly speaking, enter into their composition, but are, as it were, accessaries. We do not, therefore, at present, know any other principles of saline substances, except several combustible matters, oxygen, some incombustible substances, and caloric. It is known, that most acids are the residues of burned bodies, and that they can contain different proportions of combustible matter and oxygen, so that they exist in very different states, according to the quantity of these constituent matters. Every thing more which has been said, in treatises of chemistry, upon the composition of salts in general, amounts to nothing more than hypotheses, more or less ingenious, but, at the same time, more or less remote from truth.

Under this view of the subject, salts have therefore been contemplated as *mineral*, *vegetable*, and *animal*.

Mineral Salts.

The salts which belong to the mineral kingdom are very numerous, many of them are the products of nature, and are formed by the action of fire, water, and air, and by the destruction of organized bodies; the greater number, however, are formed by art, or at least have not yet been found among natural products. The methodical treatment of these substances requires that they should be divided into orders, genera, and species.

The first order contains such saline substances as serve to compose the second order, and are therefore called primitive.

The second order contains secondary, compound, or neutral salts, which are formed by the mutual combination of the simple salts, and are consequently much less simple than the first.

Each of these orders is divided into several genera, and these again into species.

ORDER I.

Simple or primitive Salts.

Under this order is comprehended those salts which were formerly thought to be altogether simple or primitive, and which are occasionally called simple salts still. The accurate experiments of the moderns have proved that these are for the most part compounded; but the term is retained with greater propriety when it is observed, that these salts compose, when united, the salts which are termed secondary. These salts are never met with perfectly pure in nature, but require artificial processes to render them so. This order is divided into three genera, comprehending saline terrestrial substances, alkalis, and acids.

Genus I.

Saline terrestrial Substances.

The three substances which compose this genus have hitherto been considered as earths whose characters manifestly resemble those of salts.

This genus contains three species;

1. Barytes.
2. Magnesia.
3. Quicklime.

Genus II.

Alkaline Salts.

These possess an urinous, burning, and caustic taste, turn the syrup of violets to a green, have a strong affinity for acids, dissolve animal substances, unite readily with water, combine with oils and fat, and render them miscible with water, dissolve sulphur, and are crystallizable. The species of this genus are,

1. Potash.
2. Soda.
3. Ammoniac.

Genus III.

Acids.

These are distinguished by their sour taste when diluted with water; they redden blue vegetable colours. Many exist in an aerial form; they unite with great rapidity to alkalis; their action on inflammable substances is much stronger than that of the last-mentioned salts, and most commonly reduces them to the state of bodies which have been burnt. The following species enter this genus:

Mineral Acids.

1. Carbonic.
2. Muriatic.
3. Fluoric.
4. Nitric.
5. Sulphuric.
6. Boracic.
7. Molybdic.
8. Tungstic.
9. Arsenic.
10. Succinic.

Vegetable Acids.

11. Acetic.
12. Citric.
13. Gallic.
14. Malic.
15. Benzoic.
16. Tartareous.
17. Oxalic.

Acids formed by the Action of Fire.

18. Pyro-tartarous.
19. Pyro-mucous.
20. Pyro-lignous.

Acids formed by the Nitric Acid.

21. Camphoric.
22. Suberic.
23. Ciceric.

Animal Acids.

24. Phosphoric.
25. Lithic.
26. Formic.
27. Bombic.
28. Zoonic.
29. Amniotic.
30. Sebacic.
31. Galactic.
32. Sacchic-lactic.

ORDER II.

Secondary or Neutral Salts.

Under the name of secondary salts are comprehended such matters as are composed of two primitive saline substances combined together. These salts are called neutral, because they do not possess the characters of primitive salts; that is to say, they are neither acid nor alkaline. There are, however, many salts, such as borax, chalk, and alkalies, when united with the carbonic acid, which exhibit some of the properties of primitive salts, though in a less eminent degree. These secondary salts have not so strong a taste as most of the primitive, their tendency to combination, and their solubility, being less considerable; but the criterion which distinguishes them more especially from the former is, that they cannot, like the primitive salts, communicate the saline properties to other bodies; their crystalline form is likewise a character much attended to by naturalists, and sometimes indicates their nature, though it may be productive of error when too much depended on.

The term base is commonly applied to the more fixed matter which enters into the composition of neutral salts. As this base, which is sometimes volatile, communicates several general characters, sufficiently uniform in the several combinations it makes with acids, the name of the base is assumed to distinguish the genera of secondary salts. These salts are therefore divided into as many genera as there are saline or alkaline bases capable of being united with acids.

The first genus comprehends such as are formed by the union of fixed alkalies with acids. These are called perfect neutral salts, because the union of their component parts is very intimate.

The second genus includes such as are formed by the combination of the volatile alkali or ammoniac with acids. They are distinguished by the name of ammoniacal salts from that which has been given to their base by later chemists. They may likewise be called imperfect salts, because they are much more easily decomposed than salts of the first genus.

The third genus embraces those which have lime for their basis. These are in general less perfect than those of the second genus, though lime has a stronger affinity to acids than ammoniac. These salts are denominated neutral calcareous salts.

Magnesia, combined with various acids, constitutes the fourth genus. They are more decomposable than those of the last mentioned genus, because lime and alkalis have a stronger affinity with acids than magnesia. They are distinguished by the name of magnesian neutral salts.

The fifth genus comprehends such as have pure argillaceous earth or alumina for their base. As alum is the principal of these combinations, the generic name of aluminous salts is given to them. Alkalies, lime, and magnesia, in most instances, decompose salts with an aluminous base.

The sixth genus comprehends neutral salts with a base of barytes or ponderous earth. These salts, as well as the two preceding genera, are but little known.

It may easily be imagined, that these bases, combined with the acids, must afford a great number of neutral salts; and that this number would be still more considerable, were we to admit, as peculiar salts, the union of the same substances with the acids.

In the subsequent arrangement of the various neutral salts, the order of the affinities of the acids is followed; that is to say, we begin with sulphuric salts, after which we place nitric salts, and after them, the salts into which the muriatic, the boracic, and the floric acids enter; and lastly, finish with the salts which contain carbonic acid, because that acid is the weakest of them all. To denote all these salts, names composed of the acids and their bases are adopted, in order that this nomenclature may express the nature of each; and that there no longer may be any error on this point, the different names which each neutral salt has received at different times are exhibited.

GENUS I.

Neutral salts with basis of fixed alkali.

Species.	*Ancient names.*
1. Sulphat of potash. The sulphuric acid with potash.	Vitriolated tartar. Sal de duobus. Arcanum duplicatum. Vitriol of potash.
2. Sulphat of soda. The sulphuric acid with soda.	Glauber's salt. Vitriol of soda.
3. Nitrat of potash. Nitric acid with potash.	Common nitre. Saltpetre.
4. Nitric of soda. Nitric acid with soda.	Cubic nitre. Rhomboidal nitre.
5. Muriat of potash. The muriatic acid with potash.	Digestive salt. Febrifuge salt of sylvius. Regenerated marine salt.
6. Muriat of soda. The muriatic acid with soda.	Marine salt. Sea salt. Common salt. Kitchen salt.
7. Borat of potash. The boracic acid with potash.	Vegetable borax.
8. Borax, or supersaturated borate of soda. The boracic acid with soda.	Common borax. Tincal.
9. Fluat of potash. The fluoric acid with potash.	Spathose tartar. Spar of tartar.
10. Fluat of soda. The fluoric acid with soda.	Sparry soda.
11. Carbonat of potash. The carbonic acid with potash.	Cretaceous tartar. Chalk of potash.

Species.	Ancient names.
12. Carbonat of soda. The carbonic acid with soda.	Cretaceous soda. Chalk of soda.

Genus II.

Ammoniacal neutral salts.

Species.	Ancient names.
1. Ammoniacal sulphat. The sulphuric acid with ammoniac.	Glauber's secret ammoniacal salt. Ammoniacal vitriol.
2. Ammoniacal nitrat. The nitric acid with ammoniac.	Ammoniacal nitre.
3. Ammoniacal muriat. The muriatic acid with ammoniac.	Sal ammoniac.
4. Ammoniacal fluat. The fluoric acid with ammoniac.	
5. Ammoniacal borat. The boracic acid with ammoniac.	
6. Ammoniacal carbonat. The carbonic acid with ammoniac.	Sal volatile. Concrete volatile alkali. Ammoniacal chalk.

Genus III.

Calcareous neutral salts.

Species.	Ancient names.
1. Calcareous sulphat. The sulphuric acid with lime.	Plaster of Paris. Gypsum. Selenite. Calcareous vitriol.
2. Calcareous nitrat. The nitric acid with lime.	Calcareous nitre.
3. Calcareous muriat. The muriatic acid with lime.	Fixed sal ammoniac. Oil of lime. Calcareous marine salt.
4. Calcareous fluat. The fluoric acid with lime.	Cubic spar. Vitreous spar. Fusible spar. Sparry fluor. Fluorated lime.
5. Calcareous borat. The boracic acid with lime.	
6. Carbonat of lime. The carbonic acid with lime.	Chalk. Calcareous spar. Calcareous earth.

Genus IV.

Magnesian neutral salts.

Species.	Ancient names.
1. Magnesian sulphat. The sulphuric acid with magnesia.	Epsom salt. Salt of Sedlitz. Bitter cathartic salt. Vitriolated magnesia.
2. Magnesian nitrat. The nitric acid with magnesia.	
3. Magnesian muriat. The muriatic acid with magnesia.	Marine salt with the base of magnesia.
4. Fluat of magnesia. The fluoric acid with magnesia.	
5. Borat of magnesia. The boracic acid with magnesia.	
6. Magnesian carbonat. The carbonic acid with magnesia.	Effervescent magnesia. Mild magnesia. Aerated magnesia. Magnesian salt.

Genus V.

Aluminous neutral salts.

Species.	Ancient names.
1. Aluminous sulphat. The sulphuric acid with aluminous earth.	Alum. Vitriol of clay.

2. Aluminous nitrat. The nitric acid with aluminous acid.	Argillaceous nitre. / Nitrous alum.
3. Aluminous muriat. The muriatic acid with aluminous earth.	Argillaceous marine salt. / Marine alum.
4. Aluminous fluat. The fluoric acid with aluminous earth.	Sparry clay. / Argillaceous fluor.
5. Aluminous borat. The boracic acid with aluminous earth.	Argillaceous borax.
6. Aluminous carbonat. The carbonic acid with aluminous earth.	Effervescent clay. / Argillaceous chalk.

Genus VI.

Neutral salts with a base of barytes, or barytic neutral salts.

Species.	*Ancient names.*
1. Barytic sulphat. The sulphuric acid with barytes.	Ponderous spar. / Barytic vitriol.
2. Barytic nitrat. The nitric acid with barytes.	Ponderous nitre. / Barytic nitre.
3. Barytic muriat. The muriatic acid with barytes.	Ponderous marine salt.
4. Barytic fluat. The fluoric acid with barytes.	
5. Barytic borat. The boracic acid with barytes.	
6. Barytic carbonat. The carbonic acid with barytes.	Aerated ponderous earth. / Cretaceous ponderous earth. / Barytic earth.

To these salts may be added such as are formed by the arsenic, molybdic, tungstenic, and succinic acids; the former of which may be distinguished by the terms arseniats of potash, soda, &c. the second molybdats of potash, soda, and so on.

Vegetable Salts.

The saline substances held in solution in the juices of plants or the water wherein they are infused are generally known by the name of essential salts. They are distinguished into six genera. The first contains vegetable salts analagous to those of the mineral kingdom. The second contains the pure acids of plants. In the third are placed such acid salts as are combined with a certain quantity of potash; these are called acidules. The fourth genus includes those which are formed by the action of the nitric acid upon certain vegetable matters. The fifth is composed of those which owe their formation to heat. The sixth genus is appropriated to such acids as are developed by a peculiar fermentation.

Genus I.

The principal species contained in this genus are:

1. *Fixed alkalies combined with carbonic acid.*—These are obtained from almost all plants by macerating them with acids. Potash is the most common, but soda exists in marine plants.

2. *Sulphat of potash.*—This neutral salt is found in milfoil, in adstringent and aromatic plants, in spurge, flax, &c.

3. *Sulphat of soda,* which exists in tamarisk and rotten wood.

4. *Nitre,* obtained from borage, turnsole, and tobacco.

5. *Muriat of potash and soda,* from marine plants.

6. *Sulphat of lime,* said to exist in rhubarb.

Genus II.

1. Citric acid.
2. Gallic acid.
3. Malic acid.
4. Benzoic acid.

Genus III.

1. Tartarous acid.
2. Oxalic acid.

Genus IV.

1. Pyro-tartarous acid.
2. Pyromucous acid.
3. Pyroligneous acid.

Genus V.

1. Acid of sugar.
2. Camphoric acid.
3. Suberic acid.
4. Acetic acid.

Genus VI.

1. Acetic acid.

Animal Salts.

The animal kingdom abounds with many of the saline substances common to vegetables, such as lime, soda, the muriatic, oxalic, malic, benzoic, sebacic, and phosphoric acids; independently of which it offers several already noticed in Order I. Genus III.

But it is unnecessary to pursue this view of the subject any farther. We must hasten to notice the last revision which the terms salts and saline substances have undergone, and the sense in which they are contemplated by the chemists of the present day. Under this new plan, acids and alkalies are equally excluded from the class, which is now restricted to denote alone the compounds formed by the combination of acids with alkalies, earths, and metallic oxyds.

No part of chemistry has been cultivated with more zeal than the salts, especially for these last 40 years. During that time the number of saline bodies has been enormously increased, and the properties of a very great number have been determined with precision. Still, however, this wide and important region is far from being completely explored.

Chemists upon the new system have agreed to denominate the salts from the acids which they contain. The earth, alkali, and metallic oxyd, combined with that acid, is called the base of the salt. Thus common salt being a compound of muriatic acid and soda, is called a muriat; and soda is called the base of common salt. Now since there are 32 acids and 57 bases, it would ap-

pear, at first sight, that there are 1824 salts; but of the 45 metallic oxyds at present known, there are a considerable number which cannot combine with many of the acids. This is the case also with silica, and perhaps with some of the other earths. We must therefore subtract all these from the full number 1824. To compensate, however, this deficiency, at least in part, there are several acids capable of combining with two bases at once. Thus the tartaric acid combines at once with potass and soda. Such combinations are called triple salts, and they increase the number of salts considerably. There are some salts, too, which are capable of combining with an additional dose of their acid, and others which combine with an additional dose of their base. The French chemists denote the first of these combinations by adding to the usual name of the salt the phrase with excess of acid, or by prefixing it to the word acidulous: they denote the second by subjoining the phrase with excess of base. This method of naming has the merit indeed of being precise, but it is exceedingly awkward, and intolerably tedious. The ingenious mode of naming these combinations proposed by Dr. Pearson ought certainly to be preferred. It is equally precise, if not more so, and far more convenient in every respect. It consists in prefixing to the usual name of the salt the preposition super, to denote an excess of acid, and the preposition sub to denote an excess of base. Thus sulphat of potass denotes the salt in its state of perfect neutralization, without any excess either of the sulphuric acid or of the potass; supersulphat of potass is the same salt with an excess of acid; subsulphat of potass is the same salt with excess of base. These three different kinds must increase the number of saline compounds very considerably; but the precise number of salts is not known, as many of them remain still unexamined by chemists. Probably they are not much fewer than 2000. Some idea may be formed of the progress which this branch of chemistry has made, by recollecting that 40 years ago not more than 30 salts in all were known.

Of these 2000, however, a considerable number may be considered as still unknown, as they have been merely formed without being examined. Of those which are known, the greater number have not been applied to any use, and therefore do not deserve a very particular description.

As the different genera of salts are denominated from their acids, it is evident that there are as many genera as there are acids. The terminations of the names of these genera differ according to the nature of the acids which constitute them. When that acid contains a maximum of oxygen, the termination of the genus is *at*; when it does not contain a maximum of oxygen, the termination of the genus is *ite*. Thus the salts which contain sulphuric acid are called sulphats; those which contain sulphurous acid are called sulphites. This distinction is of some consequence, because the salts differ very much, according as the acid is saturated with oxygen or not. The *ites* are seldom permanent; when exposed to the air, they usually attract oxygen, and are converted into *ats*.

Every particular species of salt is distinguished by subjoining to the generic term the name of its base. Thus the salt composed of sulphuric acid and soda is called sulphat of soda. Triple salts are distinguished by subjoining the names of both the bases connected by hyphens. Thus the compound of tartaric acid, potass, and soda, is called tartrat of potass-and-soda.

The salts then naturally divide themselves into two grand classes; the first of which comprehends the alkaline and earthy salts, which derive their most important characters from their acids; the second comprehends the metalline salts, whose bases on the contrary stamp their most important properties.

Salts, or the combinations of alkalies with acids which exist in the mineral kingdom, constitute the following genera and species:

Mineral Salts.

Genus I. Potass.

Sp. 1. Nitrat of potass.

Genus II. Soda.

Sp. 1. Carbonat of soda.
2. Sulphat of soda.
3. Muriat of soda.
4. Borax.

Genus III. Ammonia.

Sp. 1. Muriat of ammonia.

Genus I. Salts of Potass.

Sp. 1. *Nitrat of potass.*—This salt is found native, mixed with nitrat of lime, muriat of potass, and other impurities, encrusting the surface of the earth in different parts of India, the Cape of Good Hope, Peru, Spain, Molfetta, &c. It is most commonly in fine capillary crystals. Sometimes, though rarely, massive, or in six-sided prisms.

Its primitive form is a rectangular octahedron. It occurs sometimes in that form, but more frequently the apexes of the pyramids are truncated. But its most usual variety is a six-sided prism, terminated by six-sided pyramids. A specimen of native nitre from Molfetta, analysed by Klaproth, contained

44.55 nitrat of potass.
25.45 sulphat of lime.
30.40 carbonat of lime.
0.20 muriat of potass.

100.60

Genus II. Salts of Soda.

Sp. 1. *Carbonat of soda.*—This salt is found in Egypt on the surface of the earth, and on the margin of certain lakes which become dry during the summer. It has often the appearance of a rough dusty powder, of a grey colour and alkaline taste. It occurs in China, where it is called kien; near Tripoli, where it is denominated trona; and likewise in Hungary, Syria, Persia, and India.

It is said sometimes to have been observed in crystals. The primitive form is a rhomboidal octahedron; but the pyramids are usually truncated.

A specimen of this salt from Egypt was found by Klaproth to consist of

32.6 dry carbonat of soda.
20.8 dry sulphat of soda.
15.0 dry muriat of soda.
31.6 water.

100.0

A specimen of fibrous carbonat from the interior of Africa yielded the same chemist

37.0 soda.
38.0 carbonic acid.
22.5 water.
2.5 sulphat of soda.

100.0

Sp. 2. *Sulphat of soda.*—This salt is found in Austria, Hungary, Styria, Switzerland, and Siberia, always in the neighbourhood of a mineral spring. It occurs usually in the state of powder, sometimes massive, and even crystallized. Colour greyish, or yellowish white.

Sp. 3. *Muriat of soda.*—Common salt is found in immense masses under the earth's surface in many countries, particularly in Poland, Hungary, England, &c. Near Cordova in Spain there is said to be a mountain of common salt 500 feet high, and nearly three miles in circumference. There are two varieties of native common salt distinguished by their texture.

1. Foliated.—This variety is usually found in vast masses, and sometimes crystallized in cubes. Colour various shades of grey and of red. Internal lustre glassy. Texture foliated. Fragments cubic. Streak grey. Specific gravity 2.143. Taste salt.

2. Fibrous.—Found in masses, strata, or stalactitic. Colour various shades of grey, blue, red. Texture fibrous; fibres delicately curved. Fragments angular.

Sp. 4. *Borax.*—This mineral is found in different parts of Thibet, &c. It is usually mixed with foreign bodies; that of Persia is in large crystals, enclosed in a fatty matter. The primitive form of its crystals is a rectangular prism, but it occurs usually in six-sided prisms, whose edges are variously truncated. Its colour is greyish, yellowish, or greenish white. Fracture foliated or conchoidal. Refracts doubly. Taste sweet, and somewhat acrid.

Genus III. Salts of Ammonia.

Sp. 1. *Muriat of ammonia.*—This salt occurs near volcanoes, of which it is a product. It is found also in Persia. It is found usually in the state of powder in the middle of lava. Sometimes in mass, and even in very irregular crystals. Colour white, often with a shade of yellow or green. Very soft.

A specimen of this salt from Tartary yielded Klaproth,

97.5 muriat of ammonia.
2.5 sulphat of ammonia.

100.0

There is no necessity for entering any further in this article into the detail of the compound salts, as the reader will find them under the different heads of Acetites, Fluats, Gallats, Lactats, Malats, Mellats, Muriats, Nitrats, Nitrites, Phosphats, Phosphites, Sulphats, Sulphites; also under the different acids: and the metallic compounds under the respective metals.

Salt. *a.* 1. Having the taste of salt (*Bacon*). 2. Impregnated with salt (*Addison*). 3. Abounding with salt (*Jeremiah*). 4. (*salax*, Lat.) Lecherous; salacious (*Shakspeare*).

To Salt. *v. a.* (from the noun.) To season with salt (*Brown*).

Sa'lt-pan. Sa'lt-pit. *s.* (*salt* and *pan*, or *pit*.) Pit where salt is got (*Bacon*).

Salt Lake, a lake of New York, in Onondago county, five miles long and one broad. It is capable of producing immense quantities of salt; one person, in 1792, having boiled down at the rate of 50 bushels a week. It is half a mile S. of Seneca river, to which it sends its waters.

SALTA, a town of Tucuman, of great resort on account of the large quantities of corn, meal, wine, salt, cattle, and other commodities, which are sent hence to most parts of Peru. It is 280 miles N.N.W. of St. Jago del Estero. Lon. 66. 30 W. Lat. 24. 40 S.

Sa'ltant. *a.* (*saltans*, Lat.) Jumping; dancing.

SALTASH, a borough in Cornwall, governed by a mayor, with a market on Saturday, and a trade in malt. It is seated on the side of a steep hill, near the mouth of the Tamar, six miles N.W. of Plymouth, and 220 W. by S. of London.

Salta'tion. *s.* (*saltatio*, Latin.) 1. The act of dancing or jumping (*Brown*). 2. Beat; palpitation (*Wiseman*).

SALTATORY, applied to the legs of insects: having the thighs thicker and formed for leaping.

Saltce'llar. *s.* (*salt* and *cellar*.) Vessel of salt set on the table (*Swift*).

SALTCOATS, a seaport of Scotland, in Ayrshire, with a considerable trade in salt and coal, and also in ship-building. It is situate on the frith of Clyde, five miles W. by N. of Irvine, and 28 S.W. of Glasgow. Lon. 4. 45 W. Lat. 55. 40 N.

Sa'lter. *s.* (from *salt*.) 1. One who salts. 2. One who sells salt (*Camden*).

Sa'ltern. *s.* A salt-work (*Mortimer*).

SALTERELLA. (Ital.) A particular kind of jig, so called from the dance of that name chiefly consisting of leaping motions.

SALTFLEET, a town in Lincolnshire, with a market on Saturday, situate on a creek of the German ocean, 33 miles E.N.E. of Lincoln, and 158 N. by E. of London.

SALTIER, one of the honourable ordinaries.—See Heraldry. This, says G. Leigh, in his Accedence of Arms, was anciently made of the height of a man, and driven full of pins, the use of which was to scale walls, &c. Upton says it was an instrument to catch wild beasts, whence he derives this word from *saltus*, i. e. a forest. The French call this ordinary *sautoir*, from *sauter* to leap; because it may have been used by soldiers to leap over walls of towns, which in former times were but low; but some modern authors think it is borne in imitation of St. Andrew's cross.

SALTINBA'NCO. *s.* (*saltare in banco*.) A quack or mountebank (*Brown*).

Sa'ltish. *a.* (from *salt*.) Somewhat salt.

Sa'ltless. *a.* (from *salt*.) Insipid; not tasting of salt.

Sa'ltly. *ad.* (from *salt*.) With taste of salt; in a salt manner.

Sa'ltness. *s.* (from *salt*.) Taste of salt.

SALTPETRE: for its mineralogical character, see Nitrum.

SALVABI'LITY. *s.* (from *salvable.*) Possibility of being received to everlasting life (*Decay of Piety*).

SA'LVABLE. *a.* (from *salvo*, Lat.) Possible to be saved (*Decay of Piety*).

SALVADOR (St.), one of the Bahama islands. See GUANAHAMI.

SALVADOR (St.), the capital of the kingdom of Congo. It stands on a large mountain, whose summit is a plain, 10 miles in circuit and well cultivated. The city has 12 churches, beside the cathedral, and a large palace, in which the king and a Portuguese bishop reside. It is 230 miles E.S.E. of Loango. Lon. 14. 20 E. Lat. 5. 40 S.

SALVADOR (St.), a city of Brasil, capital of the province of All-Saints Bay, and an archbishop's see, with several forts. The cathedral is large, but the most superb structure in the city is the grand church of the ex-jesuits, built of European marble, and the internal part exceedingly rich. The houses are two or three stories high, and built of stone. The principal streets are large, but the generality are narrow and dirty. In the royal square is the governor's house, the mint, and the public offices; and along the beach is the custom-house, dock-yard, storehouses, &c. There are many gardens, full of a great variety of fruit-trees, herbs, and flowers. The chief commodities are cotton, sugar, tobacco, coffee, gums, wood, hides, tallow, and trainoil. The inhabitants are estimated at upward of 100,000. It is seated on an eminence, in the bay of All-Saints, 120 miles S.W. of Sergippy. Lon. 39. 30 W. Lat. 13. 30 S.

SALVADOR DE JUJUI (St.), a city of Tucuman, situate at the foot of a high mountain, on a river of its name, which flows E. to the Vermejo. It is 280 miles N.N.E. of St. Jago del Estero. Lon. 66. 20 W. Lat. 24. 5 S.

SALVADORA, in botany, a genus of the class tetandria, order monogynia. Calyx four-toothed; corol four-cleft; berry one-seeded; seeds invested with an aril, or deciduous coat. One species only, salvadora Persica, a native of Persia and India, with lanceolate opposite leaves, and terminal panicle.

SALVAGE-MONEY, a reward allowed by the civil and statute law for the saving of ships or goods from the danger of the sea, pirates, or enemies.—Where any ship is in danger of being stranded, or driven on shore, justices of the peace are to command the constables to assemble as many persons as are necessary to preserve it; and, on its being preserved by their means, the persons assisting therein shall, in 30 days after, be paid a reasonable reward for their salvage; otherwise the ship or goods shall remain in the custody of the officers of the customs as a security for the same.

SALVAGES, small uninhabited islands, lying between the Canary islands and Madeira, 27 leagues N. of Point Nago in Teneriff. Lon. 15. 54 W. Lat. 30. 0 N.

SALVATELLA. (*vena*, from *salus*, health, because the opening of it was formerly thought to be of singular use in melancholy.) This vein runs along the little finger, unites upon the back of the hand with the cephalic of the thumb, and empties its blood into the internal and external cubital veins.

SALVATERRA, a town of Portugal, in Estremadura, with a royal palace, seated on the Tajo, at the influx of the Soro, 35 miles N.E. of Lisbon.

SALVATERRA, a strong town of Portugal, in Beira. It was taken by the French in 1704, and by the allies in 1705. It stands on the frontiers of Spain, 12 miles N.N.W. of Alcantara, and 37 E. by S. of Castel Branco.

SALVA'TION. *s.* (from *salvo*, Latin.) Preservation from eternal death; reception to the happiness of heaven (*Milton*).

SA'LVATORY. *s.* (*salvatoire*, Fr.) A place where any thing is preserved (*Hale*).

SALU'BRIOUS. *a.* (*salubris*, Lat.) Wholesome; healthful; promoting health (*Philips*).

SALU'BRITY. *s.* (from *salubrious.*) Wholesomeness; healthfulness.

SALVE. *s.* (realp, Saxon; from *salvus*, Latin.) 1. A glutinous matter applied to wounds and hurts; an emplaster (*Donne*). 2. Help; remedy (*Hammond*).

To SALVE. *v. a.* (*salvo*, Latin.) 1. To cure with medicaments applied (*Spenser*). 2. To help; to remedy (*Sidney*). 3. To help or save by a *salvo*, an excuse, or reservation (*Hooker*). 4. To salute: obsolete (*Spenser*).

SA'LVER. *s.* A plate on which any thing is presented (*Pope*).

SALVER-SHAPED COROL, in botany. Hypocrateriformis corolla. Monopetalous, rising from a tube, with a flat border.

SALVIA. Sage. In botany, a genus of the class diandria, order monogynia. Corol irregular; filaments transversely affixed to a pedicel; seeds four, naked. Seventy-six species, scattered over the globe; two indigenous to our own meadows. We shall give an example or two.

1. S. officinalis. Garden-sage. Leaves lanceolate-ovate, crenulate; whorls few-flowered; calyxes mucronate. This admits of many varieties; the common green sage; the wormwood; the green with a variegated leaf; the red with a variegated leaf. The species is indigenous to the south of Europe, and in all its varieties largely cultivated among ourselves. In ancient times it was celebrated as a remedy of great efficacy, as would appear from the following lines of the school of Salernita:

Cur moriatur homo, cui salvia crescit in horto?
Contra vim mortis, non est medicamen in hortis.
Salvia salvatrix, naturæ conciliatrix.
Salvia cum ruta faciunt tibi pocula tuta.

But at present it is not considered as an article of much importance. It has a fragrant strong smell; and a warm, bitterish, aromatic taste, like other plants containing an essential oil. It has a remarkable property in resisting the putrefaction of animal substances, and is in frequent use among the Chinese as a tonic, in

the form of tea, in debility of the stomach and nervous system.

2. S. pomifera. Leaves heart-elliptic, obtuse, downy, with a crenulate, undulate margin; whorls crowded; calyxes trifid, obtuse. A native of Syria and Crete.

3. S. horminum. Clary. Leaves obtuse, crenate; upper bractes barren; larger ones coloured; a native of Greece.

4. S. sclarea. Garden-clary. Leaves wrinkled, heart-shaped, villous, serrate; floral bractes longer than the calyx, concave, pointed. A native of Syria and Italy.

The several sorts of sage propagated either for the kitchen, or for medicine, are to be produced by cuttings planted in any of the summer months, watering and shading them till they have taken new root; after which they should be removed to a dry soil, where they may have the benefit of the sun.

The different sorts of horminum, or clary, are propagated from seeds, which should be sown in the spring, in the places where the plants are designed to remain; they require no other care than to be kept clean from weeds, and thinned where they come up too close; they flower in June and July, and ripen their seeds in autumn.

The sclarea, or garden clary, is also propagated by seeds, which should be sown in the spring upon a bed of fresh earth. When the plants are fit to be removed, they should be transplanted in rows, two feet asunder, and one foot distant in the rows; after they have taken root, they will require no farther care than to be kept clean from weeds, and will thrive upon any soil that is not wet.

SA'LVO. *s.* (from *salvo jure*, Latin.) An exception; a reservation; an excuse (*Addison*).

SA'LUTARINESS. *s.* (from *salutary*.) Wholesomeness; quality of contributing to health or safety.

SA'LUTARY. *a.* (*salutaris*, Lat.) Wholesome; healthful; safe; advantageous; contributing to health or safety (*Bentley*).

SALUTATION, the act of saluting, greeting, or paying respect and reverence to any one. There is a great variety in the forms of salutation. The orientals salute by uncovering their feet, laying their hands on their breasts, &c. In England, we salute by uncovering the head, bending the body, &c. The pope formerly paid reverence to none except the emperor, to whom he stooped a very little, when he permitted him to kiss his lips. A prince, or person of extraordinary quality, is saluted at his entering a garrison by the firing of the cannon round the place. In the field, when a regiment is to be reviewed by a king, or his general, the drums beat as he approaches, and the officers salute him one after another, as he passes by, stepping back with the right foot and hand, bowing their half pikes to the ground, and then recovering them gently, bringing up the foot and hand, and planting them; which done, they pull off their hats without bowing. The ensigns salute all together, bringing down their colours near the ground directly before them at one motion, and having taken them up again, gently lift their hats. At sea, they salute by a discharge of cannon, which is greater or less, according to the degree of respect they would show; and here ships always salute with an odd number of guns, and galleys with an even one. To salute with muskets is to fire one, two, or three vollies; which is a method of salutation that sometimes precedes that of cannon, and is chiefly used on occasion of feasts. After the cannon, they also sometimes salute or hail with the voice, by a joint shout of all the ship's company, repeated three times; which salutation also occasionally obtains where they carry no guns, or do not care to discharge any. Saluting with the flag is performed two ways, either by holding it close to the staff so as it cannot flutter, or by striking it so as it cannot be seen at all, which is the most respectful. Saluting with the sails is performed by hovering the top-sails half-way of the masts. Only those vessels that carry no guns salute with the sails.

The following regulations on this subject are deserving of notice: "When any of his majesty's ships shall meet with any ship or ships belonging to any foreign prince or state, within his majesty's seas (which extend to Cape Finisterre), it is expected that the said foreign ships do strike their top-sail, and take in their flag, in acknowledgment of his majesty's sovereignty in those seas: and if any shall refuse, or offer to resist, it is enjoined to all flag-officers and commanders to use their utmost endeavours to compel them thereto, and not suffer any dishonour to be done to his majesty. And if any of his majesty's subjects shall so much forget their duty, as to omit striking their top-sail in passing by his majesty's ships, the name of the ship and master, and from whence, and whither bound, together with affidavits of the facts, are to be sent up to the secretary of the admiralty, in order to their being proceeded against in the admiralty court. And it is to be observed, that in his majesty's seas, his majesty's ships are in nowise to strike to any; and that in no other parts, no ship of his majesty is to strike her flag or top-sail to any foreigner, unless such foreign ship shall have first struck, or at the same time, strike her flag or top-sail to his majesty's ship. The flag-officers and commanders of his majesty's ships are to be careful to maintain his majesty's honour upon all occasions, giving protection to his subjects, and endeavouring, what in them lies, to secure and encourage them in their lawful commerce; and they are not to injure, in any manner, the subjects of his majesty's friends and allies."

To SALUTE. *v. a.* (*saluto*, Latin.) 1. To greet; to hail (*Shakspeare*). 2. To please; to gratify (*Shakspeare*). 3. To kiss.

SALU'TE. *s.* (from the verb.) 1. Salutation; greeting (*Brown*). 2. A kiss (*Roscommon*).

SALU'TER. *s.* (from *salute*.) He who salutes.

SALUTI'FEROUS. *a.* (*salutifer*, Latin.) Healthy; bringing health (*Dennis*).

SALUZZO, a town of Piedmont, capital of a marquisate of the same name, with a bishop's see, and a castle. The cathedral is magnificent and rich. It is seated on an eminence, at the foot of the Alps, near the river Po, 22 miles S. by W. of Turin. Lon. 7. 37 E. Lat. 44. 44 N.

SAMAR, PHILIPPINA, or TANDAGO, one of the Philippine Islands, S.E. of that of Luconia, from which it is separated by a strait. It is 320 miles in circumference, and is full of craggy mountains, among which are fertile vallies.

SAMARA, a town of Russia, in the government of Ufa, situate at the junction of the rivers Salmisch and Sakmara, 12 miles N. of Orenburg. Lon. 55. 5 E. Lat. 53. 2 N.

SAMARA, a town of Russia, in the government of Simbirsk, near the Volga, 76 miles S.S.E. of Simbirsk. Lon. 49. 26 E. Lat. 53. 20 N.

SAMARA, in botany, a genus of the class tetrandria, order monogynia. Calyx four-parted; corol four-petalled; stamens immersed in the base of the petal; stigma funnel-form; drupe one-seeded. Four species; natives of the East and West Indies and of the Cape.

SAMARCAND, an ancient and populous city, in the country of the Usbec Tartars, with a castle and a university. It was the birthplace and seat of Tamerlane the Great. It carries on a trade in excellent fruits, and is seated near the Sogde, which runs into the Amo, 138 miles E. by N. of Bokhara. Lon. 65. 15 E. Lat. 39. 50 N.

SAMARIA (anc. geog.) one of the three larger Cisjordan districts, situated in the middle between Galilee to the N. and Judea to the S. beginning at the village Ginæa, in the Campus Magnus, and ending at the toparchy called Acrobatena (Josephus). Its soil differing in nothing from that of Judea; both equally hilly and champaign, both equally fertile in corn and fruit (Id.) Called the kingdom of Samaria in Ephraim (Bible); comprising the ten tribes, and consequently all the country to the N. of Judea and E. and W. of Jordan.

SAMARIA, the capital city of the kingdom of Samaria, or of the ten tribes. It was built by Omri king of Israel, who began to reign in the year of the world 3079, and died 3086 (1 Kings xvi. 24). He bought the hill Samaria of Shemer for two talents of silver, or for the sum of 684l. 7s. 6d. It took the name of Samaria from Shemer the owner of the hill; though some think there were already some beginnings of a city, because, before the reign of Omri, there is mention made of Samaria (1 Kings xiii. 32.) in the year of the world 3030. But others take this for a prolepsis, or an anticipation, in the discourse of the man of God, who speaks of Samaria under the reign of Jeroboam.

SAMARITANS, an ancient sect among the Jews; still subsisting in some parts of the Levant, under the same name.

Its origin was in the time of Rehoboam; under whose reign, a division was made of the people of Israel into two distinct kingdoms. One of these kingdoms, called Judah, consisted of such as adhered to Rehoboam, and the house of David; the other retained the ancient name of Israelites, under the command of Jeroboam. The capital of the state of these latter was Samaria; and hence it was that they were denominated Samaritans.

Some affirm that Salmanazar, king of Assyria, having conquered Samaria, led the whole people captive into the remotest parts of his empire; and filled their place with colonies of Babylonians, Cutheans, and other idolaters. These finding themselves daily destroyed by wild beasts, it is said, desired an Israelitish priest to instruct them in the ancient laws and customs of the land they inhabited. This was granted them; and they thenceforth ceased to be incommoded with any beasts. However, with the law of Moses, they still retained somewhat of their ancient idolatry. The rabbins say, they adored the figure of a dove on mount Gerizim.

Upon the return of the Jews from the Babylonish captivity, and the rebuilding of Jerusalem and the temple, the religion of the Samaritans received another alteration on the following occasion. One of the sons of Jehoiada the high priest, whom Josephus calls Manasseh, married the daughter of Sanballat the Horonite; but the law of God having forbidden the intermarriages of the Israelites with any other nation, Nehemiah set himself to reform this corruption, which had spread into many Jewish families, and obliged all that had taken strange wives immediately to part with them. Nehem. xiii. 23—30. Manasseh, unwilling to surrender his wife, fled to Samaria; and many others in the same circumstances, and with similar disposition, went and settled under the protection of Sanballat, governor of Samaria. From that time the worship of the Samaritans came much nearer to that of the Jews, and they afterwards obtained leave of Alexander the Great to build a temple in Mount Gerizim, near the city of Samaria, in imitation of the temple of Jerusalem, where they practised the same forms of worship.

Notwithstanding the charge above mentioned, it is certain, the modern Samaritans are far from idolatry: some of the most learned among the Jewish doctors own, that they observe the law of Moses more rigidly than the Jews themselves.—They have a Hebrew copy of the Pentateuch, differing in some respects from that of the Jews; and written in different characters, commonly called Samaritan characters; which Origen, Jerom, and other fathers and critics, ancient and modern, take to be the primitive character of the ancient Hebrews; though others maintain the contrary. The point of preference, as to purity, antiquity, &c. of the two Pentateuchs, is also much disputed by the modern critics.

Origen, Jerom, and Epiphanius inform us, that the Samaritans rejected all the sacred writings except the five books of Moses.

The Samaritans are now few in number;

though it is not very long since they pretended to have priests descended directly from Abraham. They were chiefly found at Gaza, Neopolis (the ancient Sichem), Damascus, Cairo, &c. They had a temple, or chapel, on Mount Gerizim, where they performed their sacrifices.

Joseph Scaliger, being curious to know their usages, wrote to the Samaritans of Egypt, and to the high-priest of the whole sect, who resided at Neopolis. They returned two answers, dated in the year 998 of the Hegira of Mahomet. These answers never came to the hands of Scaliger. They are now in the French king's library, and have been translated into Latin by father Morin, priest of the Oratory; and printed in the collection of letters of that father in England, 1682, under the title of Antiquitates Ecclesiæ Orientalis. M. Simon has inserted a French translation, in the first edition of Ceremonies et Coûtumes des Juifs, by way of supplement to Leo de Modena.

In the first of these answers, written in the name of the assembly of Israel, in Egypt, they declare, that they celebrate the passover every year, on the fourteenth day of the first month, on Mount Gerizim; and that he who then did the office of high-priest was called Eleazar, a descendant of Phinehas, son of Aaron.—At present they have no high-priest. In the second answer, which is in the name of the high-priest Eleazar, and the synagogue of Sichem, they declare, that they keep the sabbath in all the rigour wherewith it is enjoined in the book of Exodus; none among them stirring out of doors but to the synagogue. They add, that on that night they do not lie with their wives; that they begin the feast of the passover with the sacrifice appointed for that purpose in Exodus; that they sacrifice nowhere else but on Mount Gerizim; that they observe the feasts of harvest, the expiation, the tabernacles, &c. They add farther, that they never defer circumcision beyond the eighth day; never marry their nieces, as the Jews do; have but one wife; and, in fine, do nothing but what is commanded in the law: whereas the Jews frequently abandon the law to follow the inventions of their rabbins.

At the time when they wrote to Scaliger, they reckoned one hundred and twenty-two high-priests; affirmed that the Jews had no high-priests of the race of Phinehas; and that the Jews belied them, in calling them Cutheans; for that they are descended from the tribe of Joseph by Ephraim.

SAMATHAN, a town of France, in the department of Eure, with a strong castle on a mountain. It is seated in a valley, on the river Save, five miles N. of Lombez. Lon. 1. 0 E. Lat. 43. 34 N.

SAMBAC, in botany. See JASMINUM.

SAMBAS, a town of the island of Borneo, capital of a kingdom of the same name, near the W. coast. In its vicinity diamonds are found. Lon. 109. 0 E. Lat. 2. 20 N.

SAMBRE, a river of the Netherlands which rises in Picardy, and passing by Landrecy, Maubeuge, Thun, and Charleroy, falls into the Maese, at Namur.

SAMBUCUS. Elder. In botany, a genus of the class pentandria, order trigynia. Calyx five-parted, superior; corol five-cleft; berry three-seeded. Five species: the following are the chief.

1. S. nigra. Common elder. Cymes five-parted; leaflets ovate, serrate; stem arboreous. Found wild in our own hedges. Many varieties; some from variegation of leaf; others of berry, which are white, green, or black. The plant has an unpleasant narcotic smell, and some authors have reported its exhalations to be so noxious, as to render it unsafe to sleep under its shade. The parts of this tree that are proposed for medicinal use in the pharmacopœias are the inner bark, the flowers, and the berries. The first has scarcely any smell, and very little taste; on first chewing, it impresses a degree of sweetness, which is followed by a very slight but durable acrimony, in which its powers seem to reside. From its cathartic property it is recommended as an effectual hydragogue by Sydenham and Boerhaave. In small doses it is said to be an useful aperient and deobstruent in various chronic disorders. The flowers have an agreeable flavour; and infusions of them, when fresh, are gently laxative and aperient. When dry, they are said to promote chiefly the cuticular excretion, and to be particularly serviceable in erysipelatous and eruptive disorders. Externally they are used in fomentations, &c. and in the London pharmacopœia are directed in the form of an ointment. The berries in taste are somewhat sweetish, and not unpleasant; on expression they yield a fine purple juice, which proves an useful aperient and resolvent in sundry chronic diseases, gently loosening the belly, and promoting the urine and perspiration. The officinal preparation of these berries, in the London pharmacopœia, is the succus bacchæ sambuci spissatus.

2. S. racemosa. Red-berried elder. Racemes compound, ovate; stem arboreous, branching into many directions, rising ten or twelve feet high; flowers of an herbaceous white, appearing in April, succeeded by red berries when matured. A native of the south of Europe.

3. S. ebulus. Dwarf-elder. Danewort. Cymes three-parted; stipules foliaceous; stem herbaceous; three feet high; indigenous to many parts of Europe, and found wild in our own hedges. There is a variety, with cut leaves and less widely creeping roots.

SAMBUCUS. An ancient wind instrument resembling a flute: supposed to be so called from its being made of elder wood, the Latin name for which is *sambucus*, as above.

SAME. *a.* (*samo*, Gothic; *sammo*, Swedish.) 1. Not different; not another; identical; being of the like kind, sort, or degree (*Ray*). 2. That was mentioned before (*Dan.*).

SA'MENESS. *s.* (from *same.*) 1. Identity; the state of being not another; not different (*King Charles*). 2. Undistinguishable resemblance (*Swift*).

SAMIEL, the Arabian name of a hot wind, peculiar to the desert of Arabia. It blows over the desert in the months of July and August, from the north-west quarter, and sometimes it continues with all its violence to the very gates of Bagdad, but never affects any body within the walls. Some years it does not blow at all, and in others it appears six, eight, or ten times, but seldom continues more than a few minutes at a time. It often passes with the apparent quickness of lightning. The Arabians and Persians, who are acquainted with the appearance of the sky at or near the time this wind rises, have warning of its approach by a thick haze, which appears like a cloud of dust arising out of the horizon; and they immediately upon this appearance throw themselves with their faces to the ground, and continue in that position till the wind is passed, which frequently happens almost instantaneously; but if, on the contrary, they are not careful or brisk enough to take this precaution, which is sometimes the case, and they get the full force of the wind, it is instant death.

The above method is the only one which they take to avoid the effects of this fatal blast; and when it is over, they get up and look round them for their companions; and if they see any one lying motionless, they take hold of an arm or leg, and pull and jerk it with some force; and if the limb thus agitated separates from the body, it is a certain sign that the wind has had its full effect; but if, on the contrary, the arm or leg does not come away, it is as sure a sign there is life remaining, although to every outward appearance the person is dead; and in that case they immediately cover him with clothes, and administer some warm diluting liquor to cause a perspiration, which is certainly but slowly brought about.

The Arabs themselves can say little or nothing about the nature of this wind, only that it always leaves behind it a very strong sulphureous smell, and that the air at these times is quite clear, except about the horizon, in the north-west quarter, before observed, which gives warning of its approach. We have not been able to learn whether the dead bodies are scorched or dissolved into a kind of gelatinous substance; but from the stories current about them, there has been frequent reason to believe the latter; and in that case such fatal effects may be attributed rather to a noxious vapour than to an absolute and excessive heat. The story of its going to the gates of Bagdad and no further may be reasonably enough accounted for, if the effects are attributed to a poisonous vapour, and not an excessive heat.

SAMLET. See SALMO.

SAMNITES, a people of Italy. The inhabitants of Samnium, a country situate between Picenum, Campania, Apulia, and ancient Latium. They distinguished themselves by their implacable hatred against the Romans, till they were at last totally extirpated, B. C. 272, after a war of 71 years. Their chief town was called Samnium, or Samnis.

SAMOGITIA, a province of Poland, 175 miles long and 125 broad; bounded on the N. by Courland, on the E. by Lithuania, on the W. by the Baltic, and on the S. by Western Prussia. It is full of forests and high mountains, which feed a great number of cattle, and produce abundance of honey. Here are also very active horses, in high esteem. The inhabitants are clownish, but honest; and they will not allow a young woman to go out in the night without a candle in her hand, and two bells at her girdle. Rosienne is the principal town.

SAMOLUS. Brook-weed. Water pimpinel. In botany, a genus of the class pentandria, order monogynia. Corol salver-shape, five-cleft, with intermediate scales; stamens inserted into the tube opposite the segments; capsule half-inferior, one-celled, five-toothed. One species, samolus valerandi, common to the marshes of our own country, with a stiff, branchy stem.

SAMOS, an island in the Ægean sea, on the coast of Asia Minor, with a capital of the same name, built B. C. 986. It is about 87 miles in circumference. It was first in the possession of the Leleges, and afterwards of the Ionians. Juno was held in the greatest veneration there, her temple was uncommonly magnificent, and it was even said that the goddess had been born there, on the banks of the Imbrasus. Samos lies to the east of the isle of Nicaria. It is 30 miles long and 20 broad, and crossed by a ridge of hills. It abounds with partridges, woodcocks, snipes, thrushes, woodpigeons, turtle-doves, wheatears, and excellent poultry. There are no rabbits, but many hares, goats, and some sheep. Here is plenty of wheat, barley, and millet; also abundance of melons, lintels, kidney-beans, muscadine grapes, and white figs, four times as big as the common sort, but not so well tasted. The silk, honey, and wax, are esteemed; and pitch is made from the pine trees in the north part of the island. Here are some iron mines, emery stone is not scarce, and ochre is common. Most of the soil is of a rusty colour; and all the mountains are of white marble. The inhabitants are almost all Greeks, and are not tyrannised over by the Turks. The habit of the women is a vest, after the Turkish manner, with a red coif, and their hair hanging down the back in tresses, with tassels of coarse silver or block tin fastened to the ends. Samos contains several villages; and there are some remains of the celebrated temple of Juno. The principal harbour is that of Vati, on the N. side of the island. Lon. 27. 13 E. Lat. 37. 46 N.

SAMOTHRACÆ, or SAMOTHRACIA, an island in the Ægean sea, opposite the mouth of the Hebrus, on the coast of Thrace. It was known by the ancient names of Leccosia, Melitis, Electra, Leucania, and Dardania. It was once called Samos, and distinguished from

the Samos on the coast of Ionia, by the epithet of Thracian, or by the name of Samothrace. It is about 38 miles in circumference, according to Pliny, or only 20, according to modern travellers. Samothrace is famous for a deluge which inundated the country before the time of the Argonauts, and reached the very top of the highest mountains. This inundation was owing to the sudden overflow of the waters of the Euxine. As all mysteries were supposed to have taken their origin there, the island received the surname of sacred, and was an inviolable asylum to all criminals.

SAMOYEDES, once a numerous and powerful nation of Tartary. They are now dispersed: some of them are found in small detached bodies among the mountains to the W. of lake Baikal; others are supposed to be within the Chinese frontiers; others are scattered among the deserts, which extend along the Frozen ocean; and some nearly as far to the W. as Archangel. The Samoyedes have a large head, a flat face, high cheek bones, small eyes, a wide mouth, a yellow complexion, straight black hair, and little or no beard. They have no longer the use of horses, because the climate of their present country renders their subsistence impossible; but they still preserve the manners of a pastoral people, and retain the use of moveable habitations, with which they wander from place to place. They neither have, nor appear ever to have had, any kind of regular government. Their traditional songs mention only certain heroes, who, in better times, led their ancestors to battle. These songs form their principal amusements; but the exploits they celebrated are never likely to be renewed.

SAMP, in America, a name given to a sort of bread made of the maize, or Indian corn.

They first water the corn for about half an hour, and then beat it in a mortar, or grind it in a hand-mill; they then sift out the flour, and winnow the husks from it; they then mix this into a thin paste with water, and bake it in flat loaves, which they call samp-loaves, or samp-bread.

Beside this they have another dish prepared of this corn, which they esteem a great delicacy, and call by the name of samp, without the addition of loaf or bread. To make this, they only bruise or grind the corn to the size of rice, and then winnowing away the husks, they boil it gently till it is thoroughly tender, and then add to it milk, and butter and sugar: this is not only a very wholesome, but a very pleasant dish. It was the first diet of our planters when newly settled there, and is still in use, as an innocent food in sickness as well as health.

The Indians, who feed on this sort of food, are found never to be subject to the stone, and to escape several other painful diseases.

SAMPHIRE. The crithmum martimum of Linnéus. It is a low perennial plant, and grows about the sea-coast in several parts of the island. It has a spicy aromatic flavour, which induces the common people to use it as a pot-herb. Pickled with vinegar and spice, it makes a wholesome and elegant condiment which is in much esteem. See CRITHMUM.

SAMPHUCUS. See SAMBUCUS.

SA'MPLE. *s.* (from *example.*) A specimen; a part shown, that judgment may be made of the whole (*Prior*).

To SA'MPLE. *v. a.* To show something similar (*Ainsworth*).

SA'MPLER. *s.* (*exemplar*, Latin.) A pattern of work; a piece worked by young girls for improvement (*Shakspeare*).

SAMSOE, an island of Denmark, on the E. coast of N. Jutland, 12 miles long and three broad, and very fertile. It has a town of the same name, and the inhabitants carry on some commerce in small vessels. Lon. 10. 33 E. Lat. 56. 2 N.

SAMSON, the son of Manoah, of the tribe of Dan. He was endowed with extraordinary bodily powers, by which he obtained several advantages against the Philistines. At length he fell into their hands through the treachery of his mistress Delilah, and having put out his eyes, they made him work at a mill. On a public festival, when the Philistines were assembled in the temple of Dagon, Samson was sent for to shew them sport by his great strength, when laying hold of the pillars on which the building rested, he bowed himself and pulled down the whole fabric, by which himself and above 3000 persons were slain, B. C. 1117.

SAMUEL (Books of), two canonical books of the Old Testament, as being usually ascribed to the prophet Samuel. The books of Samuel and the books of Kings are a continued history of the reigns of the kings of Israel and Judah; for which reason the books of Samuel are likewise styled the first and second books of Kings. Since the first 24 chapters contain all that relates to the history of Samuel, and the latter part of the first book and all the second include the relation of events that happened after the death of that prophet, it has been supposed that Samuel was author only of the first 24 chapters, and that the prophets Gad and Nathan finished the work. The first book of Samuel comprehends the transactions under the government of Eli and Samuel, and under Saul the first king; and also the acts of David while he lived under Saul; and is supposed to contain the space of 101 years. The second book contains the history of about 40 years, and is wholly spent in relating the transactions of David's reign.

SAMYDA, in botany, a genus of the class decandria, order monogynia. Calyx coloured; corolless; nectary campanulate, bearing the stamens; capsule berried within, four-valved, one-celled: seeds wrapped in a pulpy pellicle. Ten species, natives of the East and West Indies and New South Wales; for the most part shrubs or shrubby.

SANA, the capital of Arabia Felix, in Yemen Proper, with a castle, on a hill, in which are two palaces. The city, properly so

called, is not very populous; for gardens occupy a part of the space within the walls, which are four miles in circuit, and contains seven gates. Here are a number of mosques, some of them built by Turkish pachas; also several palaces, twelve public baths, and some large caravansaries. Fruits are very plenteous, particularly grapes; and the exportation of raisins is considerable, one kind of which is without stones. The city stands near the source of a river, which flows S. into the Arabian sea, and at the foot of Mount Nikkum, on which is to be seen the ruins of a castle, said to have been built by Shem. It is 250 miles N.N.E. of Mocha, and 490 S.E. of Mecca. Lon. 45. 10 E. Lat. 15. 24 N.

SANA, or ZANA, a town of Peru, capital of a jurisdiction, in the bishopric of Truxillo. It is situate in a valley, fertile in fruit and corn, and adorned with the most beautiful flowers, whence it has been sometimes called Miraflores. It is 90 miles N. of Truxillo. Lon. 78. 30 W. Lat. 40. 35 N.

SA'NABLE. *a.* (*sanabilis*, Lat.) Curable; susceptive of remedy; remediable.

SANATION. *s.* (*sanatio*, Latin.) The act of curing (*Wiseman*).

SA'NATIVE. *a.* (from *sano*, Lat.) Powerful to cure; healing (*Bacon*).

SA'NATIVENESS. *s.* (from *sanative*.) Power to cure.

SANASHYGOTTA, a town of Hindustan, capital of a circar, in Bengal; seated on the Mahanada, 165 miles N. of Moorshedabad. Lon. 88. 30 E. Lat. 26. 37 N.

SANCERRE, a town of France, in the department of Cher. The wines produced in its environs are much esteemed. It is seated on a mountain, near the river Loire, 22 miles N.W. of Nevers, and 110 N. of Paris.

SANCHES (Antonio Nunes Ribeiro), a learned Portuguese physician, born in 1699. He studied at Leyden under the celebrated Boerhaave, who being requested by the empress of Russia to recommend her three physicians, fixed upon Sanches as one; and by this recommendation he was appointed to the hospital at Moscow; where he remained till 1734, when he was appointed physician to the army, in which capacity he was present at the siege of Azoph. He was afterwards made first physician to the empress, but the revolution of 1742 placing the princess Elizabeth Petrowna upon the throne, he lost all his appointments: and it was with great difficulty he avoided the fate of many of his friends, who perished on the scaffold. He, however, obtained leave to retire from Russia, and disposed of his library to the academy of St. Petersburgh, of which he was an honorary member. In 1747 he went to reside at Paris, where he remained till the time of his death, which happened in 1783. As an author he is well known for his Origin of the Venereal Disease.

SANCHO (Ignatius), a negro of extraordinary character, born 1729, at sea, on board a ship in its passage from Guinea to Spanish America. He was baptized at Carthagena, by the name of Ignatius; and, when two years old, was brought to England, and given to three maiden sisters near Greenwich, who contemptuously bestowed on him the appellation of Don Quixote's squire. Though treated with harshness, he found a friend in the duke of Montague, after whose death he lived with the duchess as butler, and at her decease received an annuity of 30*l*. A habit of low debauchery, however, and a fondness for gaming, ruined his little fortune, till at last reflection brought him back to his senses, and as he was partial to theatrical representations, he presented himself to pourtray the person of Othello and Oroonoko. The attempt did not answer the public expectation; but though thus disappointed, a marriage with a young woman of West India origin dictated to him the necessity of industrious exertions. By the friendship of the Montague family, he was placed above want, and settled in a small grocery shop, where his good conduct enabled him to provide a decent subsistence for himself and his numerous family. He died 1780. He was author of several letters, which possess great originality, and evince considerable intellectual powers.

SANCHONIATHON, a Phœnician historian, born at Berytus, or, according to others, at Tyre. He flourished a few years before the Trojan war, and wrote, in the language of his country, an history in nine books, in which he amply treated of the theology and antiquities of Phœnicia and the neighbouring places. This history was translated into Greek; a few fragments are extant, which some suppose to be spurious, while others contend that they are authentic.

SANCIAN, an island of China, on the coast of Quan-tong, 40 miles in circumference, and famous for being the burying place of Francis Xavier, whose tomb is to be seen on a small hill.

SANCILE, in botany. Bear's ear. See CORTUSA.

SANCROFT (William), archbishop of Canterbury, was born at Fresingfield, in Suffolk, in 1616; and admitted into Emanuel college, Cambridge, in 1633. In 1642 he was elected a fellow; and, for refusing to take the covenant, was ejected from his fellowship. In 1660 he was chosen one of the university preachers; and in 1663 was nominated to the deanry of York. In 1664 he was installed dean of St. Paul's. In this station he set himself with unwearied diligence to repair the cathedral, till the fire of London in 1666 employed his thoughts on the more noble undertaking of rebuilding it, toward which he gave 1400*l*. He also rebuilt the deanry, and improved the revenue of it. In 1668 he was admitted archdeacon of Canterbury, on the king's presentation. In 1677, being now prolocutor of the convocation, he was unexpectedly advanced to the archbishopric of Canterbury. In 1678 he was committed to the Tower, with six other bishops, for presenting a petition to the king against reading the declaration of indulgence;

Upon king James II.'s withdrawing himself, he concurred with the lords in a declaration to the prince of Orange for a free parliament, and due indulgence to the Protestant dissenters. But when that prince and his consort were declared king and queen, his grace refusing to take the oaths to their majesties, he was suspended and deprived. He lived in a very private manner, till he died in 1693. His learning, integrity, and piety, made him an exalted ornament of the church. He published a volume in 12mo, entitled Modern Politics, taken from Machiavel, Borgia, and other choice authors. Familiar Letters to Mr. North, an 8vo pamphlet, and three of his sermons were printed together after his death.

SANCTIFICA'TION. *s.* (*sanctification*, French.) 1. The state of being freed, or act of giving freedom from the dominion of sin for the time to come (*Hooker*). 2. The act of making holy; consecration (*Stillingfleet*).

SA'NCTIFIER. *s.* (from *sanctify*.) He that sanctifies or makes holy (*Derham*).

To SA'NCTIFY. *v. a.* (*sanctifier*, French.) 1. To free from the power of sin for the time to come (*Hebrews*). 2. To make holy (*Add.*). 3. To make a means of holiness (*Hooker*). 4. To make free from guilt (*Dryden*). 5. To secure from violation (*Pope*).

SANCTIMO'NIOUS. *a.* (from *sanctimonia*, Latin.) Saintly; having the appearance of sanctity (*L'Estrange*.)

SA'NCTIMONY. *s.* (*sanctimonia*, Latin.) Holiness; scrupulous austerity; appearance of holiness (*Raleigh*).

SA'NCTION. *s.* (*sanction*, Fr. *sanctio*, Latin.) 1. The act of confirmation which gives to any thing its obligatory power; ratification (*Ben Jonson*). 2. A law; a decree ratified (*Denham*).

SA'NCTITUDE. *s.* (from *sanctus*, Latin.) Holiness; goodness; saintliness (*Milton*).

SA'NCTITY. *s.* (*sanctitas*, Lat.) 1. Holiness; the state of being holy (*Shakspeare*). 2. Goodness; the quality of being good; purity; godliness (*Addison*). 3. Saint; holy being (*Milton*).

SANCTORIUS, a most ingenious and learned physician, was a professor in the university of Padua, in the beginning of the 17th century. He contrived a kind of statical chair, by means of which, after estimating the aliments received, and the sensible discharges, he was enabled to determine with great exactness the quantity of insensible perspiration, as well as what kind of victuals and drink increased or diminished it. On these experiments he erected a curious system, which he published under the title of De Medicina statica; of which we have an English translation by Dr. Quincy. Sanctorius published several other treatises, which showed great abilities and learning.

To SA'NCTUARISE. *v. n.* (from *sanctuary*.) To shelter by means of sacred privileges: not in use (*Shakspeare*).

SA'NCTUARY. *s.* (*sanctuarium*, Latin.) 1. A holy place; holy ground; the most retired and awful part of a temple (*Rogers*). 2. A place of protection; a sacred asylum (*Milt.*). 3. Shelter; protection (*Dryden*).

SANCTUARY, among the Jews, was the holiest and most retired part of the temple of Jerusalem, wherein was preserved the ark of the covenant, and into which nobody was allowed to enter but the high-priest, and that only once a-year, to intercede for the people.

The sanctuary, called also sanctum sanctorum, or holy of holies, is supposed to be a type or figure of heaven, and of Jesus Christ the true high-priest, who is ascended thither to make intercession for us.

Some will have it, that the whole temple was called the sanctuary: and that the sanctum sanctorum, where the ark was kept, was only a little chapel or oratory therein. To try or examine a thing by the weight of the sanctuary, is to examine it by a just and equal scale; because, among the Jews, it was the custom for the priests to keep stone weights, to serve as standards for regulating all weights by, though these did not differ from the royal or profane weights.

SANCTUARY, in our ancient customs, denotes an asylum, or place privileged by the prince, for the safeguard of men's lives, who were guilty of capital crimes.

In Scotland they call the sanctuary girtholl, or gyrthol.—The Saxons also called it frodmortel and fridstoll.

Till Henry VIII. all our churches and church-yards were sanctuaries; and protected persons accused of any crime (except treason, wherein the crown, and sacrilege, wherein the church, was too nearly concerned) who fled to them; and who, within forty days after, went in sackcloth, and confessed themselves guilty before the coroner, and declared all the particular circumstances of the offence; and who thereupon took the oath in that case provided, viz. that they abjured the realm, and would depart from thence forthwith, at the first port that should be assigned them, and would never return without leave from the king: by this means they saved their lives, if they observed the conditions of the oath, by going with a cross in their hands, and with all convenient speed, to the port assigned, and embarking; for if, during these forty days privilege of sanctuary, or in the road to the sea side, they were apprehended and arraigned in any court for this felony, they might plead the privilege of sanctuary, and had a right to be remanded, if taken out against their will. But by this abjuration their blood was attainted, and they forfeited all their goods and chattels. During this time, if any layman expelled them, he was excommunicated; if a clerk, he was made irregular; but after forty days no man might relieve them.

The immunity of these privileged places was very much abridged by the statutes 27 Henry VIII. cap. 19, and 32 Henry VIII. cap. 12. And now, by the statute 21 Jac. I. cap. 20. all privilege of sanctuary, and abjuration conse-

quent thereupon, is utterly taken away and abolished.

St. John's of Beverley had an eminent sanctuary, called by the Saxons, a seat of peace: so had St. Martin's le Grand, in London. Rippon had the like granted by Whitlafe, king of the Mercians; so had St. Burien's in Cornwall, granted by king Athelstan, anno 936; and Westminster had the like, granted by Edward the Confessor.

SANCTUARY is also used in the Romish church, for the chancel, or that part of the church wherein the altar is placed, encompassed with a rail or balustrade.

SANCTUM SANCTORUM. See SANCTUARY.

SANCUS, SANGUS, or SANCTUS, a deity of the Sabines, introduced among the gods of Rome under the name of Dius Fidius. According to some, Sancus was father to Sabus, or Sabinus, the first king of the Sabines.

SAND, in mineralogy, ARENA, under which word the present article should rather have been printed. Consisting of comminuted siliceous stones; rough, hard, dry, in minute, distinct granulations, not penetrable by water; not fusible per se, but melting with soda into glass. Eight species, of which the first in the following order originates from comminuted flint-stones, and all the rest are composed of comminuted quartz.

1. Arena silicea. Siliceous sand. Composed of fragments of flint. Found in Buckinghamshire and other places.

2. A. sabulum. Gravel. Consisting of angular, unequal, larger grains. Found every where on barren rocky mountains, and is produced by granite, which has mouldered from exposure to the air, and is frequently found mixed with particles of mica, feldspar, and argil. It is principally used for gravel walks.

3. A. micacea. Shining with numerous interspersed small scales of mica, resembling thin plates of gold or silver, in colour and lustre. Found in Sweden and Germany; and a variety of it in the island Cassarita, and is composed of comminuted granite and other like stones. It is the sand used to dry up the ink on newly written letters.

4. A. rustica. Common sand. Consisting of roundish, unequal, larger grains. Found every where in Europe, principally upon shores, and contains some lamellar particles, apparently of quartz. It is used for gravelling walks.

5. A. colorata. In rounded, minute, transparent grains, tinged with oxyd of iron. Found in South America and Europe, principally on the shores of lakes; colour yellow, yellowish, or testaceous, rarely red, violet in the Baltic near Germany. It is used for sprinkling over letters, and makes admirable gravel walks.

6. A. glarea. Dust sand. In very minute grains mixed with pulverised alumina. Found on barren commons and heaths; is very easily blown about when dry, but when wet is rather plastic, and yields to the pressure of the hand. It is chiefly used in the beds and moulds where metals are cast.

7. A. horaria. Hour-glass sand. In larger unequal, round, transparent, whitish grains. Found on barren heaths and woody commons, and principally used in hour-glasses.

8. A. mobilis. Quick sand. In very minute, round, transparent, white grains. Found in the sea and adjacent wastes, and is also thrown out from springs; when dry, so light as to be driven about by the winds and collected into sand-banks, and often taken up in vast masses by whirlwinds, overwhelming and suffocating travellers, and even whole villages. It is kept compact by the roots of elymus arenarius, arundo arenarius, triticum repens, and some species of salix.

Sand is of great use in the glass manufacture, since, as we have already observed, it will fuse when mixed with soda. It is the white writing sorts that are employed in making white glass, and a coarser greenish looking sand for green glass.

In agriculture it seems to be the office of sand to make unctuous earths fertile, and fit to support vegetables, &c. For earth alone, we find, is liable to coalesce and gather into a hard coherent mass. Common sand is, therefore, a very good manure to all sorts of clay lands; it warms them, and makes them more loose and open. The best sand for the farmer's use is that which is washed by rains from roads or hills, or that which is taken from the beds of rivers; the common sand dug in pits never answers so well. If used at all, this last should be mixed with dung; and a very fine manure is made by covering the bottom of sheep-folds with several loads of sand every week, which are to be taken away and laid on cold and stiff lands, impregnated as they will hereby be with the dung and urine of the sheep. Sea sand is also used as manure, in different parts of the kingdom; the fine grained is that which appears to succeed best.

SAND-BAGS. See SACK.

SAND-BOX TREE. See HURA.

SAND-CRACK, a crack or cleft in a horse's foot, proceeding from a separation of the fibres of the hoof in a perpendicular direction. If it extend to the coronet, it is extremely troublesome to cure. Horses are most liable to this disease that have either strong and brittle hoofs, or narrow heels. Blood horses are more subject to them than inferior horses.

In the treatment of them, the part round the crack must be rasped thin. The firing iron should be drawn above and below it to the extent of the fissure, in order to prevent its extension. The iron should also be carried over the crack, by which means a slight degree of moisture will exude, and glue up the part; which may be covered with digestive ointment, spread on tow, and secured by a bandage.

The horse must have a bar shoe, which will rest firmly on the frog, and be hollowed in the part which is opposite to the seat of the disease, so that no pressure may be made on that part of the foot. Rest should also be allowed for a

few days; and, after this, only moderate exercise permitted, until the fissure has descended towards the inferior part of the foot.

SAND EEL. See AMMODYTES.

SAND FLOOD, a terrible mischief, incident to the lands of Suffolk, and some other parts of England; which are frequently covered with vast quantities of sand, rolling in upon them like a deluge of water, from sandy hills in their neighbourhood.

The flowing of sand, though far from being so tremendous and hurtful as in Arabia, is of very bad consequences in this country, as many valuable pieces of land have thus been entirely lost; of which we give the following instances from Mr. Pennant, together with a probable means of preventing them in future. "I have more than once," says he, "on the eastern coasts of Scotland, observed the calamitous state of several extensive tracts, formerly in a most flourishing condition, at present covered with sands, unstable as those of the deserts of Arabia. The parish of Furvie, in the county of Aberdeen, is now reduced to two farms, and above 500*l.* a year lost to the Errol family, as appears by the oath of the factor in 1600, made before the Court of Session, to ascertain the minister's salary. Not a vestige is to be seen of any buildings, unless a fragment of the church. The estate of Coubin, near Forres, is another melancholy instance. This tract was once worth 300l. a year, at this time overwhelmed with sand. This strange inundation was still in motion in 1769, chiefly when a strong wind prevailed. Its motion is so rapid, that I have been assured, that an apple tree had been so covered with it in one season, that only the very summit appeared. This distress was brought on about ninety years ago, and was occasioned by the cutting down some trees, and pulling up the bent or star which grew on the sand-hills; which at last gave rise to the act of 15 Geo. II. c. 33, to prohibit the destruction of this useful plant.

"I beg leave to suggest to the public a possible means of putting a stop to these destructive ravages. Providence hath kindly formed this plant to grow only in pure sand. Mankind was left to make, in after times, an application of it suitable to their wants. The sand-hills on a portion of the Flintshire shores, in the parish of Llanasa, are covered with it naturally, and keep firm in their place. The Dutch perhaps owe the existence of part, at least, of their country to the sowing of it on the *mobile solum*, their sand-banks. My humane and amiable friend, the late Benjamin Stillingfleet, Esq. recommended the sowing of this plant on the sandy wilds of Norfolk, that its matted roots might prevent the deluges of sand which that country experiences. It has been already remarked, that wheresoever this plant grows the salutary effects are soon observed to follow. A single plant will fix the sand, and gather it into a hillock; these hillocks, by the increase of vegation, are formed into larger, till by degrees a barrier is made often against the encroachments of the sea, and might as often prove preventive of the calamity in question. I cannot, therefore, but recommend the trial to the inhabitants of many parts of North Britain. The plant grows in most places near the sea, and is known to the highlanders by the name of murah; to the English by that of bent-star, matgrass, or marram. Linnéus calls it arundo arenaria. The Dutch call it helm. This plant hath stiff and sharp-pointed leaves, growing like a rush, a foot and a half long: the roots both creep and penetrate deeply into their sandy beds: the stalk bears an ear five or six inches long, not unlike rye; the seeds are small, brown, and roundish. By good fortune, as old Gerard observes, no cattle will eat or touch this vegetable, allotted for other purposes, subservient to the use of mankind."

SAND-PIPER, in ornithology. See TRINGA.

SAND-STONE, in mineralogy, ARENARIUS, under which word this article should rather have been written. Consisting of grains of sand cemented together; occurring in stratified mountains, and forming entire strata, rocks, hills, or mountains; generally of a common form, and breaking into indeterminate fragments. Between thirty and forty species; which may be thus subdivided.

A. Simpler, with a siliceous cement. Of which the following are the chief.

1. Arenarius elasticus. Elastic sand-stone. Elastic, hard, apyrous, in somewhat scaly particles. Found in Brazil, of a hoary colour, rough, and not effervescing with acids; in larger pieces it may easily be bent backwards or forwards, when it returns to its former position with a small spring, and a slight degree of crackling noise: in a white heat it does not lose the least particle of its weight, nor, as far as respects its smaller particles, of its transparency.

2. A. Avanturino. Avanturine. Hard, taking a fine shining polish, consisting of tawny grains unequally tinged. Found in Britain, Spain, Bohemia, and Saxony.

3. A. Cos. Grind-stone. Siliceous sand-stone. Hardish, brittle, not taking a polish, consisting of lesser unequal grains. Found in Britain and various parts of Europe, of a rufous, yellowish, white or grey colour; sometimes mixed with particles of mica, or containing vestiges of shells: it is chiefly used for grind-stones, scythe-stones, and buildings, and is supposed to produce consumption in those who inhale its fine dusty particles.

4. A. filtrum. Filtering stone. Hard, filtering water, consisting of larger equal grains. Found in the Canaries, on the shores of New Spain, in Saxony, and Bohemia, generally grey, with pellucid angular grains. Its chief use is to render salt waters sweet, or turbid ones clear.

5. A. fundamentalis. Hardish, consisting of unequal, angular, opaque, larger grains. Found in Britain, particularly in Devonshire and Cheshire; in Sweden and other parts; rigid to the touch, difficult to break into pieces, falling into sand in a small degree of heat;

colour white, grey, greenish, brown, red, or yellowish; it is rather solid, and when cut horizontally is used for the foundation of buildings.

B. With a calcareous cement: comprising nine species, the cement consisting of spar, white chalk, white marble, marl or swinestone, and the different species differing in degree of hardness, in colour, and size or form of their grains. The chief under this division is

6. A. quadrum. Hardish, consisting of lesser grains, conglutinated by a cement of marl. Found in Britain, Germany, Sweden, France, &c. grey, yellowish, or reddish, and forming horizontal or oblique clefts. Under ground it is moist and easily cut, but hardens when exposed to the air, and at length moulders, is bibulous when quite dry, and scales off in a frosty air. It is principally used in architecture.

C. With an argillaceous cement: comprising seven species, conglutinated by a cement of porcelain clay, or of common rufous alumina; and varying in the size or form of their grains. The chief are,

7. A. porcellanus. Consisting of grains conglutinated by porcelain clay. Found in a coal-pit near Boserup in Norway: under ground it is soft, but hardens when exposed to the air, and does not melt in the fire.

8. A. fissilis. Separable into tables or plates. Found in Britain, Sweden, Spain, Germany, &c. varying much in degrees of hardness, size, and transparency of its grains, thickness of the plates into which it may be separated, and colour, but is generally whitish or reddish. It may be used for tiling, unless it be too porous.

D. With a metallic oxyd, supplying the place of a cement. Four species, the oxyd being of iron, cobalt, or copper. The following are mostly worthy of notice.

9. A. amnigenius. Hard, consisting of grains conglutinated by a cement of a small quantity of oxyd of iron. Found in Sweden and Germany, of a red or yellow colour. The inhabitants near the river Hankipudas, in Ostrobothnia, dig the sand from the bottom of the river, collect it into heaps, and leave it for a year or two to the influence of the atmosphere, when it becomes so impregnated with iron, that they form their hearths of it.

10. A. ferruginosus. Ferruginous sandstone: consisting of grains conglutinated with a larger portion of oxyd of iron. Found in Britain and Germany, of a brownish or yellowish colour, and is frequently impressed with the casts of shells. It is sometimes so rich in iron ore as to be worked with advantage.

E. More compound: comprising sandstone variously cemented, and intermixed with fragments of quartz or slate, with mica, feldspar, garnets, schorl, or talc; making eight species, of which the following are the chief.

11. A. griseus. Granwack. Composed of unequal grains cemented by indurated alumina, with frequently fragments of quartz and slate. Found in the Ural mountains of Siberia, in those of Saxony, and other parts of the continent, in strata alternating with layers of slate and Lydian stone, and is often rich in metallic veins; the argil is blueish grey, tending to black; the grains generally white, rarely greenish or red, but varying much in size and proportion; sometimes it contains spar or bitumen, or the vestiges of animal or vegetable substances, with rarely a little mica.

12. A. novacularis. Undulate-stone; whetstone. Consisting of smaller grains mixed with mica. Found every where in mountains and hills of sands, especially those of a more recent date; colour reddish, yellowish, rufous, the mica white or black, and disposed longitudinally or in dots; it has generally a slaty, sometimes an undulating slaty texture, and may easily be separated into plates; it is found in layers, and when broken has a rather glittering appearance, exhibiting mostly a fine grain.

13. A. molaris. Mill-stone. Hard, consisting of unequal angular grains of quartz and feldspar interspersed with mica: sometimes interspersed with garnets or crystallized shorl. Found generally through Europe; is of a very hard texture, and is used for corn-mills: the grains of quartz are transparent, generally white and larger; those of the feldspar are less, more opake and grey.

14. A. variolosus. Tiger-stone. White, in small grains, filtering water, with ferruginous perforations. Found in Nericia and Westrogoth, in Sweden: the spots and perforations originate from small pieces of pyrite imbedded, and which moulder into an ochraceous oxyd.

SAND-WASP, in entomology. See AMMOPHILA.

SANDA, one of the Orkney islands, about 12 miles in length, but of an irregular form, and seldom above a mile in breadth. It lies N. of that of Stronsay, from which it is separated by a narrow channel. Much kelp is made here in summer, and it feeds many sheep and beeves. On the Star Point is a lighthouse. Lon. 2. 15 W. Lat. 59. 21 N.

SANDA, a small island on the W. coast of Scotland, near the Mull of Cantyre, famed for having been the rendezvous of the Danish fleets during their expeditions to the western coasts. On it are the remains of a chapel, dedicated to St. Columba.

SANDAL, in antiquity, a rich kind of slipper worn on the feet by the Greek and Roman ladies, made of gold, silk, or other precious stuff; consisting of a sole, with a hollow at one extreme to embrace the ancle, but leaving the upper part of the foot bare.

SANDAL, is also used for a shoe or slipper worn by the pope and other Romish prelates when they officiate. It is also the name of a sort of slipper worn by several congregations of reformed monks. This last consists of no more than a mere leathern sole, fastened with latchets or buckles, all the rest of the foot being left bare. The capuchins wear sandals;

the recollects, clogs; the former are of leather, and the latter of wood.

SANDAL-WOOD. See SAUNDERS.

SANDARACHA. (*sandaracha*, σανδαραχα, a gummy resin; also a sort of arsenic, from *saghad narak*, Arab.) See SANDRACK.

SANDARACHA ARABUM. This resinous juice appears to have been the produce of a large species of juniper tree.

SANDRACK. (*sandrack*, an Arabian word.) Sandaracha. Gum juniper. A concrete resin which exudes in white tears, more transparent than mastich, from the bark of the juniperus communis of Linnéus. See JUNIPERUS. Sandrack is almost totally soluble in alkohol, with which it forms a white varnish that dries speedily. Reduced to powder it is called pounce, which prevents ink from sinking into paper, from which the exterior coating of size has been scraped away.

SANDBACH, a town in Cheshire, with a market on Thursday. In the market-place are two square stone crosses, with emblematical figures. It is seated on the Welock, 26 miles E. of Chester, and 162 N.N.W. of London.

SA'NDBLIND. *a.* (*sand* and *blind*.) Having a defect in the eyes, by which small particles appear to fly before them (*Shakspeare*).

SA'NDED. *a.* (from *sand*.) 1. Covered with sand; barren (*Mortimer*). 2. Marked with small spots; variegated with dusky specks (*Shakspeare*).

SANDEMANIANS, in ecclesiastical history, a modern sect that originated in Scotland about the year 1728, where it is at this time distinguished by the name of Glassites, after its founder Mr. John Glass, who was a minister of the established church in that kingdom; but being charged with a design of subverting the national covenant, and sapping the foundation of all national establishments by the kirk judicatory, was expelled by the synod from the church of Scotland. His sentiments are fully explained in a tract published at that time, intitled, The Testimony of the King of Martyrs, and preserved in the first volume of his works. In consequence of Mr. Glass's expulsion, his adherents formed themselves into churches, conformable in their institution and discipline to what they apprehended to be the plan of the first churches recorded in the New Testament. Soon after the year 1755, Mr. Robert Sandeman, an elder in one of these churches in Scotland, published a series of letters addressed to Mr. Hervey, occasioned by his Theron and Aspasio, in which he endeavours to shew, that his notion of faith is contradictory to the scripture account of it, and could only serve to lead men, professedly holding the doctrines commonly called calvinistic, to establish their own righteousness upon their frames, inward feelings, and various acts of faith. In these letters Mr. Sandeman attempts to prove, that faith is neither more nor less than a simple assent to the divine testimony concerning Jesus Christ, recorded in the New Testament; and he maintains, that the word faith, or belief, is constantly used by the apostles to signify what is denoted by it in common discourse, viz. a persuasion of the truth of any proposition, and that there is no difference between believing any common testimony, and believing the apostolic testimony, except that which results from the nature of the testimony itself. This led the way to a controversy, among those who were called Calvinists, concerning the nature of justifying faith; and those who adopted Mr. Sandeman's notion of it, and who took the denomination of Sandemanians, formed themselves into church order, in strict fellowship with the churches in Scotland, but holding no kind of communion with other churches. The chief opinions and practices in which this sect differs from other Christians are, their weekly administration of the Lord's supper; their love-feasts, of which every member is not only allowed but required to partake, and which consist of their dining together at each other's houses in the interval between the morning and afternoon service; their kiss of charity used on this occasion, at the admission of a new member, and at other times, when they deem it to be necessary or proper; their weekly collection before the Lord's supper for the support of the poor, and defraying other expences; mutual exhortation; abstinence from blood and things strangled; washing each other's feet, the precept concerning which, as well as other precepts, they understand literally; community of goods so far as that every one is to consider all that he has in his possession and power as liable to the calls of the poor and church, and the unlawfulness of laying up treasures on earth, by setting them apart for any distant, future, and uncertain use. They allow of public and private diversions so far as they are not connected with circumstances really sinful; but apprehending a lot to be sacred, disapprove of playing at cards, dice, &c. They maintain a plurality of elders, pastors, or bishops, in each church, and the necessity of the presence of two elders in every act of discipline, and at the administration of the Lord's supper. In the choice of these elders, want of learning, and engagements in trade, &c. are no sufficient objection; but second marriages disqualify for the office; and they are ordained by prayer and fasting, imposition of hands, and giving the right hand of fellowship. In their discipline they are strict and severe, and think themselves obliged to separate from the communion and worship of all such religious societies as appear to them not to profess the simple truth for their only ground of hope, and who do not walk in obedience to it. We shall only add, that in every church transaction, they esteem unanimity to be absolutely necessary. From this abstract of the account which they have published of their tenets and practices, it does not seem to be probable that their number should be very considerable. Indeed, it is generally allowed that there is no party of Christians so uncatholic and sectarian as the Sandemanians. A proper antidote to their

acrimonious and narrow spirit has been lately given to the world by Mr. Andrew Fuller, in his Strictures on Sandemanianism.

SANDERLING, in ornithology. See CHARADRIUS and TRINGA.

SANDERS. See SANTALUM.

SANDERS (Robert), was born near Breadalbane, about 1727, and from a comb-maker became a hackney writer in London, and was amanuensis to Lord Lyttleton when he wrote his History of Henry II. He wrote the Complete English Traveller, folio; the Newgate Calendar; Gaffer Greybeard, a novel, in 4 vols. 12mo. He projected a chronology of all nations, but died before its completion, 1783.

SANDERS (Nicholas), of Charlewood, Surrey, was educated at Winchester school, and New college, Oxford. He was with cardinal Hosius at the council of Trent, and afterwards went to Poland, and was sent by Gregory XIII. as his nuncio to Ireland, where he led for some time a wandering life in the woods and mountains, during the civil troubles, and at last died of want, 1581. He wrote against the reformation.

SA'NDEVER. *s.* That which our English glassmen call *sandever*, and the French, of whom the name probably was borrowed, *saindever*, is that recrement that is made when the materials of glass, having been first baked together, the mixture casts up the superfluous salt (*Boyle*).

SA'NDISH. *a.* (from *sand.*) Approaching to the nature of sand; loose; not close; not compact (*Evelyn*).

SANDO, an island of Japan, 87 miles in circumference, on the N. coast of Niphon; with a town of the same name. Lon. 139. 30 E. Lat. 38. 35 N.

SANDOMIR, a strong town of Poland, capital of a palatinate of the same name, with a castle on a steep rock, and several colleges. It is seated on a hill, on the Vistula, 75 miles E. by N. of Cracow, and 112 S. by E. of Warsaw. Lon 22. 0 E. Lat. 50. 21 N.

SANDORICUM, in botany, a genus of the class decandria, order monogynia. Calyx five-toothed, petals five; nectary cylindrical, truncate, bearing the anthers in its mouth; drupe filled with five nuts. One species only, a tree of the Philippine isles, with ternate leaves, and naked panicle.

SANDROCOTTUS, an Indian of a mean origin, who, after the death of Alexander, aspired to the monarchy, and made himself master of a part of the country which was in the hands of Seleucus.

SANDWICH, a town in Kent, with a market on Wednesday and Saturday. It is one of the cinque-ports, governed by a mayor, and walled round; but the walls are much decayed, and only one of the gates is standing. Its trade is much decayed, the river Stour, on which it is seated, being so choked up with sand, as to admit only small vessels. The number of inhabitants, in 1801, was 6506. It is 13 miles E. of Canterbury, and 68 E. by S. of London. Lon. 1. 20 E. Lat. 51. 16 N.

SANDWICH, a town of Massachusets, in Barnstaple county, situate at the bottom of Cape Cod, 18 miles S.E. of Plymouth.

SANDWICH ISLAND, an island in the Pacific ocean, near the W. coast of New Ireland. Lon. 149. 17 E. Lat. 2. 53 S.

SANDWICH ISLAND, one of the New Hebrides, in the Pacific ocean. Lon. 168. 33 E. Lat. 17. 41 S.

SANDWICH ISLANDS, a group of islands in the South seas, discovered by captain Cook, in 1778, and named in honour of the earl of Sandwich, under whose administration these discoveries were made. They consist of eleven islands, extending in latitude from 18. 54. to 22. 15. N. and in longitude from 150. 54. to 160. 24. W. They are called by the natives, Owhyhee, Mowee, Ranai, Morotoi, Tahoorowa, Woahoo, Atooi, Neeheeheow, Oreehoua, Morotinne, and Tahoora, all inhabited except the two last. An account of the most remarkable of which will be found in their alphabetical order, in their proper places in this work. The climate of these islands differs very little from that of the West Indies in the same latitude, though perhaps more temperate; and there are no traces of those violent winds and hurricanes, which render the stormy months in the West Indies so dreadful. There is also more rain at the Sandwich Isles, where, the mountainous parts being generally enveloped in a cloud, successive showers fall in the inland parts, with fine weather, and a clear sky, on the sea shore. Hence it is, that few of those inconveniences to which many tropical countries are subject, either from heat or moisture, are experienced here. The winds, in the winter months, are generally from east-south-east to north-east. The vegetable productions are nearly the same as those of the other islands in this ocean; but the taro root is here of a superior quality. The bread-fruit trees thrive not in such abundance as in the rich plains of Otaheite, but produce double the quantity of fruit. The sugar-canes are of a very unusual size, some of them measuring eleven inches and a quarter in circumference, and having fourteen feet eatable. There is also a root of a brown colour, shaped like a yam, and from six to ten pounds in weight, the juice of which is very sweet, of a pleasant taste, and is an excellent substitute for sugar. The quadrupeds are confined to the three usual sorts, hogs, dogs, and rats. The fowls are also of the common sort; and the birds are beautiful and numerous, though not various. Goats, pigs, and European seeds, were left by captain Cook; but the possession of the goats soon gave rise to a contest between two districts, in which the breed was entirely destroyed. The inhabitants are undoubtedly of the same race that possesses the islands south of the equator; and in their persons, language, customs, and manners, approach nearer to the New Zealanders than to their less distant neighbours, either of the Society or Friendly Islands. They are in general about the middle size, and well made; they walk very gracefully, run nimbly,

and are capable of bearing very great fatigue. Many of both sexes have fine open countenances; and the women in particular have good eyes and teeth; with a sweetness and sensibility of look, that render them very engaging. There is one peculiarity, characteristic of every part of these islands, that even in the handsomest faces there is a fulness of the nostril, without any flatness or spreading of the nose. They suffer their beards to grow, and wear their hair after various fashions. The dress of both men and women nearly resembles those of New Zealand, and both sexes wear necklaces of small variegated shells. Tattowing the body is practised by every colony of this nation. The hands and arms of the women are also very neatly marked, and they have the singular custom of tattowing the tip of the tongue. Like the New Zealanders, they have adopted the method of living together in villages, containing from a hundred to two hundred houses, built pretty closely together, without any order, and having a winding path between them. They are generally flanked towards the sea with detached walls, which are meant both for shelter and defence. These walls consist of loose stones, and the inhabitants are very dexterous in shifting them suddenly to such places as the direction of the attack may require. In the sides of the hills, or surrounding eminences, they have also little holes, or caves, the entrance to which is also secured by a fence of the same kind. They serve for places of retreat in cases of extremity, and may be defended by a single person against several assailants. Their houses are of different sizes, some of them being large and commodious, from forty to fifty feet long, and from twenty to thirty broad; while others are mere hovels. The food of the lower class consists principally of fish and vegetables, to which the people of higher rank add the flesh of dogs and hogs. The manner of spending their time admits of little variety. They rise with the sun, and, after enjoying the cool of the evening, retire to rest a few hours after sun-set. The making of canoes, mats, &c. forms the occupations of the men; the women are employed in manufacturing cloth, and the servants are principally engaged in the plantations and fishing. Their idle hours are filled up with various amusements, such as dancing, boxing, wrestling, &c. Their agriculture and navigation bear a great resemblance to those of the South-sea islands. Their plantations, which are spread over the whole sea-coast, consist of the taro, or eddy-root, and sweet potatoes, with plants of the cloth-trees set in rows. The bottoms of their canoes are of a single piece of wood, hollowed out to the thickness of an inch, and brought to a point at each end. The sides consist of three boards, each about an inch thick, neatly fitted and lashed to the bottom part. Some of their double canoes measure 70 feet in length, three and a half in depth, and twelve in breadth. Their cordage, fish-hooks, and fishing-tackle, differ but little from those of the other islands. Among their arts must not be forgotten that of making salt, which they have in great abundance, and of a good quality. Their instruments of war are spears, daggers, clubs, and slings; and for defensive armour they wear strong mats, which are not easily penetrated by such weapons as theirs. As the islands are not united under one sovereign, wars are frequent among them, which, no doubt, contribute greatly to reduce the number of inhabitants, which, according to the proportion assigned to each island, does not exceed 400,000. The same system of subordination prevails here as at the other islands, the same absolute authority on the part of the chiefs, and the same unresisting submission on the part of the people. The government is likewise monarchical and hereditary. At Owhyhee there is a regular society of priests living by themselves, and distinct in all respects from the rest of the people. Human sacrifices are here frequent; not only at the commencement of a war, or any signal enterprise, but the death of every considerable chief calls for a repetition of these horrid rites. Notwithstanding the irreparable loss in the death of captain Cook, who was here murdered through sudden resentment and violence, they are acknowledged to be of the most mild and affectionate disposition. They live in the utmost harmony and friendship with each other; and in hospitality to strangers they are not exceeded even by the inhabitants of the Friendly Islands. Their natural capacity seems in no respect below the common standard of mankind; and their improvements in agriculture, and the perfection of their manufactures, are certainly adequate to the circumstances of their situation, and the natural advantages which they enjoy.

SA'NDY. *a.* (from *sand.*) 1. Abounding with sand; full of sand (*Philips*). 2. Consisting of sand; unsolid (*Bacon*).

SANDYS (Edwin), an English prelate, born in 1519, in Lancashire. He was educated at St. John's College, Cambridge, and in 1533 became vice-chancellor of that university. He was appointed by queen Elizabeth and her council in 1559, to be one of the nine protestant divines who were to hold a disputation against as many of the Romish persuasion before both houses of parliament at Westminster. He was also one of the commissioners for deliberating on matters for the reformation of the church, and being well skilled in the oriental languages, was chosen with other bishops to make a new translation of the bible. In 1570 he was translated from the see of London to the archbishopric of York. He died in 1588.

SANDYS (Sir Edwin), second son of the above, was born about 1561, and educated at Oxford. He was collated to a prebend in York, which he afterwards resigned. He went abroad, and while at Paris, wrote his Europæ Speculum. He was knighted by James I. but he afterwards opposed the court in the parliament held in 1621, and with Mr. Seldon was committed into custody for a month.

He died in 1629, after bequeathing 1500l. to the university of Oxford, for the endowment of a metaphysical lecture.

SANDYS (George), brother of the preceding, was born in 1577. He was an accomplished gentleman, whose knowledge was greatly extended by travelling over a great part of Europe, and the east; a relation of which journey he published in folio, in 1615. He also translated Ovid's Metamorphoses, and Mr. Dryden called him the best versifier of the age. Mr. Pope mentions him with no less respect in his notes to the Iliad. He died in 1643.

SANE. *a.* (*sanus*, Latin.) Sound; healthy.

SANG. The preterit of *sing*.

SANGUI'FEROUS. *a.* (*sanguifer*, Latin.) Conveying blood (*Derham*).

SANGUIFICATION. (from *sanguis*, blood.) A natural function of the body, by which the chyle is changed into blood. The uses of sanguification are the generation of blood, which serves to fill the blood vessels, to irritate and stimulate the heart and arteries, to generate or cause heat, to secrete the humours, and to excite the vital action.

SA'NGUIFIER. *s.* (*sanguis* and *facio*, Latin.) Producer of blood (*Floyer*).

To SA'NGUIFY. *v. n.* (*sanguis* and *facio*, Latin.) To produce blood (*Hale*).

SANGUIFLUX. (from *sanguis*, blood, and *fluo*, to flow.) A hæmorrhage, or flux of blood.

SANGUINALIS. (from *sanguis*, blood; so named from its uses in stopping bleedings.) The polygonum aviculare or knot-grass is sometimes so called. See CENTUMNODIA.

SANGUINARIA, in botany, a genus of the class polyandria, order monogynia. Calyx two-leaved; petals eight; silique ovate, one-celled. One species only, sanguinaria Canadensis, Canadian sanguinaria, blood-wort, or puccoon, with a tuberose, thick, fleshy root, smooth purplish stems, and white flowers. A native of America; and in our own greenhouses flowers in the beginning of April. It is increased by parting the roots. The stems yield a yellow juice, with which the Indians tinge themselves.

SA'NGUINARY. *a.* (*sanguinarius*, Lat.) Cruel; bloody; murderous (*Broome*).

SA'NGUINARY. *s.* (*sanguis*, Lat.) An herb (*Ainsworth*).

SA'NGUINE. *a.* (*sanguineus*, Latin.) 1. Red; having the colour of blood (*Dryden*). 2. Abounding with blood more than any other humour; cheerful (*Government of the Tongue*). 3. Warm; ardent; confident (*Swift*).

SA'NGUINE. *s.* (from *sanguis*, Lat.) Blood colour (*Spenser*).

SA'NGUINENESS. SANGUI'NITY. *s.* (from *sanguine*.) Ardour; heat of expectation; confidence (*Decay of Piety. Swift*).

SANGUI'NEOUS. *a.* (*sanguineus*, Latin.) 1. Constituting blood (*Brown*). 2. Abounding with blood (*Arbuthnot*).

SANGUINEOUS APOPLEXY. See APOPLEXIA.

SANGUIS DRACONIS. Dragon's-blood. The red resinous juice which is obtained by wounding the bark of any species of the genus calamus, but chiefly that of calamus rotang, caudice, densissime aculeato, aculeis erectis, spadice erecto of Wildenow. C. O. Hexandria. Monogynia. It is chiefly obtained from the Molucca islands, Java, and other parts of the East Indies. It is generally much adulterated, and varied in goodness and purity. The best kind is of a dark red colour, which, when powdered, changes to crimson; it readily melts and catches flame; has no smell, but to the taste discovers some degree of warmth and pungency. The ancient Greeks were well acquainted with the adstringent power of this drug; in which character it has since been much employed in hæmorrhages, in alvine fluxes. At present, however, it is seldom used internally, being superseded by more certain and effectual remedies of this numerous class; and it enters no officinal composition but that of the emplastrum thuris of the London pharmacopœia. See CALAMUS.

SANGUISORBA. Burnet. In botany, a genus of the class tetrandria, order monogynia. Calyx two-leaved; germ seated between the calyx and corol; seed solitary. Three species; two indigenous to Canada; one, sanguisorba officinalis, with ovate spikes, common to our own pastures, and not unfrequently employed as food for cattle; concerning which, see HUSBANDRY.

SANGUISUGA, a leech.

SANHEDRIN, or SANHEDRIM, *Synedrium*, among the ancient Jews, the supreme council, or court of judicature, of that republic; wherein were dispatched all the great affairs both of religion and policy.

The word is derived from the Greek συνεδριον, a council, assembly, or company of people sitting together; from συν, *con*, together, and εδρα, seat.

Many of the learned agree, that it was instituted by Moses, Numbers, chap. xi. and consisted at first of seventy persons, all inspired of the Holy Ghost, who judged finally of all causes and affairs; and that they subsisted, without intermission, from Moses to Esdras. Others will have it, that the council of seventy elders, established by Moses, Numb. chap. xi. was temporary, and did not hold after his death; adding, that we find no sign of any such perpetual and infallible tribunal throughout the whole Old Testament; and that the sanhedrim was first set up in the time of the Maccabees.

The Jews, however, contend strenuously for the antiquity of their great sanhedrim; M. Simon strengthens and defends their proofs, and M. le Clerc attacks them. Be the origin and establishment of the sanhedrim how it will, it is certain it was subsisting in the time of our Saviour; that it was held at Jerusalem; and that the decision of all the most important affairs among the Jews belonged to it. The president of this assembly was called Nasi.

There were several inferior sanhedrim in Palestine, all depending on the great sanhedrim

at Jerusalem. The inferior sanhedrim consisted each of twenty-three persons; and there was one in each city and town. Some say, that to have a right to hold a sanhedrim, it was requisite there were one hundred and twenty inhabitants in the place. Where the inhabitants came short of the number of one hundred and twenty, they only established three judges.

Into the great as well as the inferior sanhedrim were admitted priests, levites, and laymen of all the tribes, provided they were of noble extraction, rich, wise, without any blemish of body, and, as was pretended, expert in magic; which last was esteemed a necessary qualification: very old people, and eunuchs, were excluded.

In each sanhedrim there were two scribes; the one to write down the suffrages of those who were for condemnation; the other to take down the suffrages of those who were for absolution.

Selden has a learned work on the subject of the Jewish sanhedrim, De Synedriis, printed at London in 1635, in three volumes, quarto.

The authority of the great sanhedrim, which consisted of 72 counsellors, 6 out of each tribe, was vastly extensive. This council decided such causes as were brought before it by way of appeal from the inferior courts. The king, the high-priest, the prophets, were under its jurisdiction. If the king offended against the law—for example, if he married above 18 wives, if he kept too many horses, if he hoarded up too much gold and silver, the sanhedrim had him stripped and whipped in their presence. But whipping they say among the Hebrews was not at all ignominious; and the king bore this correction by way of penance, and himself made choice of the person that was to exercise this discipline over him. Also the general affairs of the nation were brought before the sanhedrim. The right of judging in capital cases belonged to this court, and this sentence could not be pronounced in any other place but in the hall called *Laschat haggazith*, or the hall paved with stones, supposed by some to be the Λιθοστρωτον, or pavement, mentioned in John xix. 13. From whence it came to pass, that the Jews were forced to quit this hall when the power of life and death was taken out of their hands, 40 years before the destruction of their temple, and three years before the death of Jesus Christ. In the time of Moses this council was held at the door of the tabernacle of the testimony. As soon as the people were in possession of the land of promise, the sanhedrim followed the tabernacle. It was kept successively at Gilgal, at Shiloh, at Kirjath-jearim, at Nob, at Gibeon in the house of Obed-edom; and lastly, it was settled at Jerusalem, till the Babylonish captivity. During the captivity it was kept up at Babylon. After the return from Babylon, it continued at Jerusalem to the time of the Sicarii, or Assassins. Then finding that these profligate wretches, whose number increased every day, sometimes escaped punishment by the favour of the president or judges, it was removed to Hanoth, which were certain abodes situated, as the rabbins tell us, upon the mountain of the temple. From thence they came down into the city of Jerusalem, withdrawing themselves by degrees from the temple. Afterwards they removed to Jamnia, thence to Jericho, to Uzzah, to Shepharvaim, to Bethsanim, to Sephoris, last of all to Tiberias, where they continued to the time of their utter extinction. And this is the account the Jews themselves give us of the sanhedrim.

SANICLE (Yorkshire). See PINGUICULA.

SANICULA. Sanicle. In botany, a genus of the class pentandria, order digynia. Umbels clustered in small heads; fruit rough; central florets abortive. Three species; two indigenous to Virginia and Maryland; one to Europe, and found wild in our own woods, with root-leaves simple, and all the florets sessile. It was formerly recommended as a mild adstringent, and is supposed to have received its name from its sanative power. Its sensible qualities are a bitterish and somewhat austere taste, followed by an acrimony which chiefly affects the throat. It is only in use in the present day amongst the country people.

SANIES. Ichor. This term is sometimes applied to a thin, limpid, and greenish discharge; at other times to a thick and bloody kind of pus.

SA'NIOUS. *a.* (from *sanies.*) Running a thin serous matter, not a well-digested pus.

SA'NITY. *s.* (*sanitas*, Latin.) Soundness of mind (*Shakspeare*).

SANK. The preterit of *sink*.

SANS. *prep.* (French.) Without (*Shaks.*).

SANPOO. See BURRAMPOOTER.

SANORE-BANCABOUR, a town of Hindustan, in the kingdom of Mysore, 117 miles E. by N. of Goa. Lon. 75. 44 E. Lat. 15. 39 N.

SANQUHAR, a borough of Dumfriesshire, in the district of Nithsdale. It has a ruined castle, and is remarkable for its coal trade and a manufacture of worsted mittens and stockings. It is seated on the Nith, 24 miles N. of Dumfries. Lon. 3. 56 W. Lat. 55. 30 N.

SANTA CLARA, an island of Peru, in the bay of Guyaquil, 90 miles W. of Guyaquil. Lon. 82. 36 W. Lat. 2. 18 S.

SANTA CRUZ, a seaport on the E. side of Teneriff, on a fine bay of the same name, defended by many small batteries, and a strong fort. It has a well-built pier, and an excellent quay, on which is a handsome mall, shaded by several rows of trees. The town is irregularly built; the principal street is broad, and has more the appearance of a square than a street: at the upper end is the governor's house, and at the lower a square monument, commemorating the appearance of Nuestra Senora (Our Lady) to the Guanches, the original inhabitants of the island. Lon. 16. 26 W. Lat. 28. 27 N.

SANTA CRUZ, a seaport on the coast of Morocco, with a fort. The Moors took it from the Portuguese in 1536. It is seated at the

extremity of Mount Atlas, on Cape Aguer. Lon. 10. 7 W. Lat. 30. 38 N.

SANTA CRUZ, one of the Caribbee Islands. Lon. 64. 35 W. Lat. 17. 45 N.

SANTA CRUZ, an island in the Pacific Ocean, one of the most considerable of those of Solomon, being 250 miles in circumference. Lon. 130. 0 W. Lat. 10. 21 S.

SANTA-CRUZ, a seaport on the N. side of the island of Cuba, 60 miles E. of Havannah. Lon. 81. 16 W. Lat. 23. 10 N.

SANTA-CRUZ-DE-LA-SIERRA, a town of Peru, capital of a government of that name, in the audience of Los-Charcos, with a bishop's see. It is seated at the foot of a mountain, in a country abounding in good fruits, on the river Guapy, 300 miles E. of Plata. Lon. 59. 55 W. Lat. 19. 46 S.

SANTA FE, the capital of New Mexico, seated among mountains, near the Rio-del-Norte, 950 miles N. of Mexico. Lon. 106. 35 W. Lat. 35. 32 N.

SANTA-FE-DE-BOGOTA, the capital of New Granada, with an archbishop's see and a university. It is the seat of a new vice-royalty established in the present century, the jurisdiction of which includes the whole of Terra Firma, and the audience of Quito in Peru. It is seated on the river Madalena, in a country abounding in corn and fruit, with mines of silver in the mountains, 360 miles S. of Carthagena. Lon. 73. 5 W. Lat. 3. 58 N

SANTALUM. Sandal-wood. Saunders. In botany, a genus of the class tetrandria, order monogynia. Corol four-cleft, expanding, bearing the stamens; glands four, growing on the petals, and alternating with the stamens; berry inferior, one-seeded. One species only, santalum album, an Indian tree, with opposite, lanceolate, entire leaves, and small red flowers in terminal racemes. The height of this tree equals that of the walnut; it is burnt in small billets in India on account of the fragrant smell it diffuses; and when dried and powdered yields a colouring matter with which the orientals anoint their bodies. The outer part of the wood is white, the interior yellow; whence in medical books we read of white and yellow saunders as though they were the product of different plants. The latter kind, however, is not always to be found in sufficient quantity to repay the trouble and expence of procuring it especially, unless the trees be old; while the white, which is the exterior part of the wood, is always more abundant, and is consequently much cheaper.

Yellow saunders, distilled with water, yields a fragrant essential oil, which thickens in the cold into the consistence of a balsam, approaching in smell to ambergris, or a mixture of ambergris and roses; the remaining decoction, inspissated to the consistence of an extract, is bitterish and slightly pungent. Rectified spirit extracts, by digestion, considerably more than water; the colour of the tincture is a rich yellow. The spirit distilled off is slightly impregnated with the fine flavour of the wood; the remaining brownish extract has a weak smell, and a moderate balsamic pungency.

SANTALUM RUBRUM, the officinal name for the pterocarpus santalinus of Linnéus. The juice of this tree, like many others, affords a species of dragon's blood. See PTEROCARPUS.

SANTAREM, a town of Portugal, in Estremadura, seated on a mountain, near the river Tajo, in a country fertile in wheat, wine, and oil. It was taken from the Moors in 1447, and is 55 miles N.E. of Lisbon. Lon. 8. 25 W. Lat. 39. 2 N.

SANTEN, a town of Westphalia, in the duchy of Cleves. It has a handsome church belonging to the papists, wherein is an image of the Virgin, which, they pretend, performs a great many miracles. It is seated on the Rhine, 15 miles S.E. of Cleves. Lon. 6. 25 E. Lat. 51. 50 N.

SANTFOIN, in botany. See HEDYSARUM.

SANTOLINA. Lavender cotton. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle chaffy, downless; calyx imbricate, hemispherical. Eight species; the four following are cultivated.

1. S. chamæcyparissus. Common lavender cotton. Peduncles one-flowered, leaves hoary, toothed four-ways, the teeth obtuse; branches downy; calyx pubescent; rises nearly three feet high with a shrubby stalk, dividing into several woody branches; the flower is single, composed of sulphur-coloured fistular florets without any ray; a native of Spain and Italy. It has several varieties, as the hoary lavender cotton, the creeping, and the dark-green.

2. S. rosmarinifolia. Rosemary-leaved lavender cotton. Peduncles one-flowered; leaves linear; lower ones somewhat pubescent, and tubercled on the margin; upper ones flat, very entire; glabrous; branches and calyx glabrous. Suffruticose; three feet high, the stems terminated by large, single, globular, pale sulphur-coloured flowers. A native of Spain, and flowers from July to September.

3. S. Alpina. Alpine lavender cotton. Peduncles one-flowered; leaves doubly pinnate, stem simple: no female florets. Herbaceous; a native of Tuscany; flowers in June.

4. S. anthemoides. Chamomile-leaved lavender cotton. Peduncles one-flowered; leaves doubly-pinnate; stem much branched, villous. A palm in height, with sulphur-coloured flowers. A native of Spain, Italy, and Siberia.

These may be raised from slips or cuttings, planted out into a good border of fresh earth in the spring; in the autumn they are to be removed to the situations in which they are to remain.

SANTOLINA CHAMÆ-CYPARISSUS. The systematic name of the lavender cotton. See ABROTANUM FÆMINA.

SANTONICUM. (σαντονικον; from *Santonia*, its native place.) Cina. Semen contra. Semen sanctum. Tartareau southern-wood or wormseed. Artemisia santonica; foliis cauli-

nis linearibus pinnato-multifidis, ramis indivisis, spicis secundis reflexis, floribus quinquefloris, of Linnéus. C. O. Syngenesia. Polygamia superflua. The seeds of this plant are small, light, and oval, composed of a number of thin membranous coats of a yellowish-green colour, with a cast of brown, easily friable upon being rubbed between the fingers into a fine chaffy kind of substance. They are brought from the Levant; have a moderately strong and not agreeable smell, somewhat of the wormwood kind, and a very bitter subacrid taste. They are esteemed to be stomachic, emmenagogue, and anthelmintic; but it is especially for the last-mentioned powers that they are now administered, and from their efficacy in this way they have obtained the name of wormseed.

SANTORINI, an island of the Archipelago, to the N. of Candia, and to the S. of Nio. It is eight miles in length, and nearly as much in breadth; and near it are three or four other small islands, each of which bears evident marks of a volcanic origin. It produces plenty of barley, cotton, and wine, in which, and the cotton manufactures, its trade consists. Fruit is scarce, except figs, and it has neither oil nor wood. The inhabitants are all Greeks, about 10,000 in number, and though subject to the Turks, they choose their own magistrates. Pyrgos is the capital. Lon. 26. 1 E. Lat. 36. 10 N.

SANVITALIA, in botany, a genus of the class syngenesia, order polygamia superflua. Seeds of the ray three-awned; of the margin naked, warty; of the centre winged; calyx imbricate, flat. Two species, natives of Mexico and Peru; one with peduncled flowers.

SAONE (Upper), a department of France, including part of the late province of the Isle of France. It is named from a river, which rises in Mont Vosges, and falls into the Rhone at Lyons. The capital is Vesoul.

SAONE AND LOIRE, a department of France, including part of the late province of Burgundy. Macon is the capital.

SAORGIS, a town of Piedmont, in the county of Nice, situate on the summit of a rock. It was taken by the French in 1794. It is 17 miles N.E. of Nice. Lon. 7. 33 E. Lat. 36. 38 N.

SAP. A juice belonging to plants, the principles of which are absorbed from the earth by their roots, and which in its constituent parts and ultimate intention has a near resemblance to the chyle of animals. Its design, like that of chyle, is to nourish the different organs of the individual, and like chyle, too, it consists, when chemically examined, of water, sugar, and mucilage, with other transparent solutions, as of carbon, phosphorus, and calcareous earth. And though it has been proved by experiment, that plants can extract or compose all these materials from air and water alone; yet some substances contribute more readily to the production of sap or vegetable chyle than others, as the recrements of dead vegetable and animal matters.

In some of its qualities, however, this fluid offers a considerable difference in different species of plants. Thus in firs it is resinous; in fruit trees and some species of mimosa gummy; in almost all plants lymphatic. In euphorbia, papaper, leontodon, pinus, and various other kinds, its colour is white; in chalidonium yellow; in rumex sanguineus, dracæna draco, pterocarpus santalinus, and calamus rotang red; blue in the root of pimpinella nigra; green in several umbellate plants; but in plants in general colourless. Rafn suspected he discovered a great analogy between this fluid and the blood of animals. In the lymph of euphorbia palustris he detected with a microscope, magnifying thirty-five times, round globules like those of blood, which swam in a clear fluid, though less clear than water. Wildenow detected the same in the sap of rhus toxicodendron. Rafn, however, traced, besides the above globules, prisms in the euphorbia peplus, helioscopia, esula, cyparissias, and lathyris, though the prisms evinced some degree of difference; nor could he detect prisms of any kind except in different species of euphorbia as above, and in hura crepitans. One drop of euphorbia canariensis, Caput Medusæ, and chara nerifolia had one or two prisms only. Alcohol congealed the lymph of euphorbia, and precipitated a fibrous matter. Sulphuric acid had the same effect, but the fibres were not so thick as the former. The sap of chelidonium consisted of nothing but closely cohering globules: which affords a satisfactory proof that the sap of plants is not as Plenck supposes merely decomposed water. Rafn also found in those plants that are most cellular in their structure, as musa paradisiaca, and Strelitzia regina, the globules smaller and less fragrant than in the different species of euphorbia.

This watery mucilaginous liquid is in many instances so strongly saccharine, as to yield a very large quantity of sugar, and to furnish a very strong fermented liquor, and to evince various saline substances. For the mode by which sugar is to be obtained from sap, see the article SUGAR.

Vauquelin has made a useful though incomplete analysis of the sap of several of the common trees, chiefly with a view to the saline and earthy contents, and has discovered the presence of acetite of potash in all of them, which entitles the acetous acid to be ranked among the native acids, as well as being a product of fermentation. The following is a brief abstract of Vauquelin's experiments.

Sap of the elm.—This juice, which was collected in the spring, has a yellowish red colour, a mild mucilaginous taste, and shows no excess of acid. Ammonia produces an abundant yellowish precipitate, resoluble in acids with effervescence, and which consists chiefly of carbonated lime with a little vegetable matter. Barytic and lime water produce the same effect. Oxalic acid and nitrat of silver give a white precipitate; sulphuric acid

excites a strong effervescence, and the gass has a powerful smell of acetous acid. Chlorine (oxymuriatic acid) gives a yellow precipitate, and alcohol a flosculent one. This liquor was analyzed in the following way: 1039 grammes were heated in an open vessel, and, during the evaporation, a brown earthy matter gradually fell down and fixed to the sides of the vessel. When nine-tenths of the liquid were wasted by slow evaporation, the residue was cooled, and the brown earth was separately treated with muriatic acid, which dissolved a portion with effervescence, and left an insoluble portion, which, when washed and dried, amounted to 637 grammes. The muriatic solution decomposed by carbonat of potash gave 0·5 grammes of carbonat of lime. The evaporated liquid freed from the earthy deposit still contained much flosculent matter which was separated by filtration, and weighed when dry 43 grammes, part of which dissolved in muriatic acid, and produced by precipitation three hundred and eighteen grammes of carbonat of lime, and ·425 of insoluble vegetable matter remained. The concentrated and filtered liquor was finally evaporated to dryness, and gave 9·553 grammes of a very grey extract, strongly deliquescent, and with a pungent saline taste. Sulphuric acid added to it gave a strong smell of radical vinegar, and a notable quantity of this latter acid was procured by distilling the extract with sulphuric acid.

Sap of the ash.—This juice had a reddish-brown colour, and an astringent taste like the infusion of tar. With re-agents it was similar to the last, except that sulphat of iron was blackened with this sap, and animal jelly gave a precipitate. It contained a little acid in excess, a calcareous salt, gallic acid, and tar, besides a vegetable extract, and a slight trace of ammonia. The extract left after evaporation to dryness and calcination was found to contain a little alumine.

Sap of hornbeam.—This juice is colourless and limpid in its natural state, has a soft and decidedly saccharine taste, a smell resembling whey, and a considerable excess of acid. When exposed to the air undisturbed for a length of time, it first becomes milky, and throws up a slight down on its surface; then parts with much carbonic acid, afterwards requires a vinous smell and taste, and at the same time its acidity increases, and it becomes limpid from the subsidence of some kind of mucilage. In about five or six weeks in the summer time, this spontaneous acidity is at its highest, after which it sensibly diminishes, a thick white mucilaginous mould forms on the surface, all taste of an acid is gone, and the liquor only tastes mouldy. The same substance kept in a closed bottle remains apparently but little altered, except that there is so great a generation of acetous acid that the liquor would make by itself a good substitute for vinegar in the seasoning of food.

Sap of birch.—A colourless saccharine acid liquor, fermentable in its natural state, the extract it leaves after evaporation being equally so. M. Vauquelin attempted, but without success, to extract sugar from it by the usual means.

SAP, or SAPP, in building, as to sap a wall, &c. is to dig out the ground from beneath it, so as to bring it down all at once for want of support.

SAP, in the military art, denotes a work carried on under cover of gabions and fascines on the flank, and mantlets or stuffed gabions on the front, to gain the descent of a ditch, or the like.

It is performed by digging a deep trench, descending by steps from top to bottom, under a corridor, carrying it as far as the bottom of the ditch, when that is dry; or as far as the surface of the water, when wet.

To SAP. *v. a.* (*sapper*, Fr. *zappare*, Italian.) To undermine; to subvert by digging; to mine (*Dryden*).

To SAP. *v. n.* To proceed by mine; to proceed invisibly (*Tatler*).

SAPAJU, in mastiology. See SIMIA.

SAPERDA. In the entomology of Fabricius, a tribe of the coleopterous genus CERAMBYX, which see.

SAPHENA, in anatomy. (*Vena saphena*; from σαφης, visible.) The large vein of the leg, which ascends along the little toe over the external ankle, and evacuates part of the blood from the foot into the popliteal veins.

SA'PID. *a.* (*sapidus*, Lat.) Tasteful; palatable; making a powerful stimulation upon the palate (*Brown*).

SAPI'DITY. SA'PIDNESS. *s.* (from *sapid.*) Tastefulness; power of stimulating the palate (*Boyle*).

SA'PIENCE. *s.* (*sapience*, Fr. *sapientia*, Lat.) Wisdom; sageness; knowledge (*Swift*).

SA'PIENT. *a.* (*sapiens*, Latin.) Wise; sage (*Milton*).

SAPIENTIÆ DENTES. The four last grinders are so called, because they appear when the person is supposed to be at years of discretion. See TEETH.

SAPIENZA, three small islands, and a cape, near the S. coast of the Morea. The largest island was anciently named Sphacteria. The pirates of Barbary conceal themselves behind it, to surprise vessels which come from the gulf of Venice, or the coast of Sicily. Lon. 21. 35 E. Lat. 36. 50 N.

SAPINDUS. Soap-berry tree. In botany, a genus of the class octandria, order trigynia. Calyx four-leaved; petals four; capsules fleshy, united, swelling. Ten species; of which the two following are cultivated chiefly.

1. S. saponaria. Common soap-berry tree. Unarmed, leaves pinnate, leaflets lanceolate, with the midrib winged. Rises with a woody stalk twenty or thirty feet high, with a branchy top; the flowers produced in loose spikes at the end of the branches, small and white, succeeded by oval berries of the size of middling cherries, sometimes single, sometimes double or triple, with a saponaceous skin or cover, inclosing a smooth roundish nut of the same form, and when ripe shining black.

These nuts were formerly imported for waistcoat buttons, and were sometimes tipt with silver, or other metals; they are very durable. The berries are in some dispensatories recommended in chlorosis, under the name of nuculæ saponariæ.

2. S. rigidus. Ash-leaved soap-berry tree. Leaves pinnate; leaflets ovate-oblong, with the midrib simple; corols and fruits glabrous. The stalk is woody, rising twenty feet. A native of the West Indies and America.

Both plants should be raised from seeds procured from their native soil, and sown in small pots filled with rich earth and plunged into a hot-bed; they must be well watered, and as they rise gradually exposed to the air; but in the autumn removed again to the green-house, or which is better plunged again into the bark-bed; in other respects they should be managed as other green-house plants.

SA'PLESS. *a.* (*saploos*, Dutch.) 1. Wanting sap; wanting vital juice (*Swift*). 2. Dry; old; husky (*Dryden*).

SA'PLING. *s.* (from *sap.*) A young tree; a young plant (*Swift*).

SAPO. Soap. A composition of oils or fats with alkaline salts. The medicinal soap, sapo durus, sapo amygdalinus, is made with oil of sweet almonds, and half its weight of potash or caustic alkali. Common or soft soap, sapo mollis, is made of tallow; Spanish, or Castile soap, of oil of almonds and the alkaline salt called soda or barilla. Black soap is a composition of train oil and an alkaline salt; and green soap, of hemp, linseed, or rape oil. Soap is a substance much used in surgery and medicine, and enters into various preparations of pills, plasters, and liniments. See SODA and SOAP.

SAPONA'CEOUS. SA'PONARY. *a.* (from *sapo*, Latin, soap.) Sopy; resembling soap; having the qualities of soap (*Arbuth. Boyle*).

SAPONARIA. Soap-wort. Bruise-wort. In botany, a genus of the class decandria, order digynia. Calyx one-leafed, naked; petals five with claws; capsule superior, oblong, mostly one-celled. Nine species; of which one only, a native of our own hedges, is cultivated. It is saponaria officinalis, common soap-wort or bruise-wort. Calyx cylindrical; leaves elliptic-lanceolate. It has a perennial root, striking deep and spreading wide, and creepiug by runners; stem a foot and a half high, upright, round, rigid, reddish, panicled at the top, the panicles hemispherical, many-flowered, bracteolate, the corol flesh or rose-coloured, varying to white, and sweet-scented, the seeds blackish with a granulated surface. Flowers from July to September. There are two or three varieties; chiefly the double-flowered, and the hollow-leaved. These are all readily increased by parting the roots and planting the partings either in autumn or spring. The double sort affords variety in borders; the hollow-leaved is employed in ornamenting rock-work.

The root of this species is employed medicinally; it has no peculiar smell; its taste is sweetish, glutinous, and somewhat bitter. On being chewed for some time, it is said to discover a degree of acrimony, which continues to affect the mouth a considerable time. According to Neuman, two ounces of the root yielded eleven drachms of watery extract; but Cartheuser, from a like quantity, only obtained six drachms and twenty-four grains. This extract manifested a sweetish taste, followed by an acrid quality. The spirituous extract is less in quality, but of a more penetrating acrid taste. Decoctions of the root, on being sufficiently agitated, produce a saponaceous froth; a similar soapy quality is observable also in the extract, and still more manifestly in the leaves, insomuch that they have been used by the mendicant monks as a substitute for soap in washing of their clothes; and Bergius, who made several experiments with the saponaria, declares, that it had all the effects of soap itself.

From these peculiar qualities of the saponaria, there can be little doubt of its possessing a considerable share of medical efficacy, which we could wish to find faithfully ascertained.

The diseases for which the saponaria is recommended, as syphilis, gout, rheumatism, and jaundice, are not, perhaps, the complaints in which its use is most availing; for a fancied resemblance of the roots of saponaria with those of sarsaparilla seems to have led physicians to think them similar in their effects; and hence they have both been administered with the same intentions, particularly in fixed pains, and venereal affections. Bergius says, "in arthritide, cura mercuriale, &c. nullum aptiorem potum novi." However, according to several writers, the most inveterable cases of syphilis were cured by a decoction of this plant, without the use of mercury.

Haller informs us, that Boerhaave entertained an high opinion of its efficacy in jaundice, and other visceral obstructions.

SAPONARIA NUCULA. Baccæ Bermudenses. Soap berries. A spherical fruit, about the size of a cherry, whose cortical part is yellow, glossy, and so transparent, as to shew the spherical black nut which rattles within, and which includes a white kernel. It is the produce of the sapindus saponaria of Linnéus, which grows in Jamaica. It is said that the cortical part of this fruit has a bitter taste, and no smell; that it raises a soapy froth with water, and has similar effects with soap in washing; that it is a medicine of singular and specific virtue in chlorosis. They are not known in the shops of this country. See SAPINDUS.

SAPONULES. Saponuli. Combinations of the volatile or essential oils with different bases; as, saponule of alumine.

SAPONULES ACID. Combinations of the volatile or essential oils with different acids.

SA'POR. *s.* (Latin.) Taste; power of affecting or stimulating the palate (*Brown*).

SAPOR, a king of Persia, who succeeded his father Artaxerxes about the 238th year of the Christian era. Naturally ambitious and perceiving the indolence of the emperors of Rome, he laid waste the provinces of Mesopotamia,

Syria, and Cilicia; Gordian attempted to repel him, but his efforts were weak; and Philip, who succeeded him, bought the peace of Sapor with money. Valerian, afterwards invested with the purple, marched against the Persian monarch, but was defeated and taken prisoner. Odenatus, a celebrated prince of Palmyra, no sooner heard that the Roman emperor was a captive, in the hands of Sapor, than he attempted to release him by force of arms. The forces of Persia were cut to pieces, the wives of the treasurers of Sapor fell into the hands of the conqueror, who penetrated, with little opposition, into the very heart of the kingdom. Sapor, soon after this defeat, was assassinated by his subjects, A. D. 273, after a reign of 32 years. He was succeeded by his son, called Hormisdas. (*Marcellin,* &c.)—The 2d of that name succeeded his father Hormisdas on the throne of Persia. He was as great as his ancestor of the same name. Sapor died A. D. 380, after a reign of 70 years, in which he had often been the sport of fortune. He was succeeded by Artaxerxes, and Artaxerxes by Sapor the third, a prince who died after a reign of five years, A. D. 389, in the age of Theodosius the Great.

SAPORI'FIC. *a.* (*saporifique,* French; *sapor* and *facio,* Latin.) Having the power to produce tastes.

SAPOTA. The oval fruited sapota, whose seeds are sometimes given in form of emulsion in calculous complaints, is the acras sapota of Linnæus. It is a native of South America, and bears a fruit like an apple, which has, when ripe, a luscious taste, resembling that of the marmalade of quinces, whence it is called natural marmalade. See ACRAS.

SAPPAN LIGNUM. Logwood has been so called. See LIGNUM CAMPECHENSE.

SAPPERS, are soldiers belonging to the royal artillery, whose business it is to work at the saps, for which they have an extraordinary pay. A brigade of sappers generally consists of eight men, divided equally into two parties; and whilst one of these parties is advancing the sap, the other is furnishing the gabions, fascines, and other necessary implements. They relieve each other alternately.

SAPPHIRE, in mineralogy, a species of the siliceous genus GEMMA, which see.

SA'PPHIRINE. *a.* (*sapphirinus,* Latin.) Made of sapphire; resembling sapphire (*Don.*).

SAPPHO, or SAPHO, celebrated for her beauty, her poetical talents, and her amorous disposition, was born in the island of Lesbos, about 600 years before Christ. Her tender passions were so violent, that some have represented her attachment with three of her female companions. She conceived such a passion for Phaon, a youth of Mitylene, that upon his refusal to gratify her desires, she threw herself into the sea. Of all her compositions, nothing now remains but two fragments, whose uncommon sweetness show how meritoriously she has been called the tenth Muse. Her compositions were all extant in the age of Horace. The Sapphic verse has been called after her name.

SA'PPINESS. *s.* (from *sappy.*) The state or the quality of abounding in sap; succulence; juiciness.

SAPPURE, in mineralogy, a species of the argillaceous genus ZEOLITHUS, which see.

SA'PPY. *a.* (from *sap.*) 1. Abounding in sap; juicy; succulent (*Philips*). 2. Young; not firm; weak (*Hayward*).

SARABANDE. A dance said to be originally derived from the Saracens. According to some authors it had its appellation from a comedian named Sarabandi, who first introduced it in France. The tune of the sarabande is written in $\frac{3}{2}$ or $\frac{3}{4}$, and its character is both expressive and majestic. One of its distinguishing features is the lengthening the second note of the measure, which at once gives a gravity and consequence to the movement.

SARACA, in botany, a genus of the class diadelphia, order hexandria. Calyxless; corol funnel-form, four-cleft; filaments three on each side on the throat of the corol; legume pedicelled. One species only, an Indian tree, with pinnate leaves without an odd one, and panicles of alternate racemes.

SARACENS, a people celebrated some centuries ago, who came from the deserts of Arabia: *Sarra* in their language signifying a desert. They were the first disciples of Mahomet, and, within 40 years after his death, conquered a great part of Asia, Africa, and Europe. They kept possession of Spain till 1511, when they were expelled. They maintained a war in the Holy Land, a long time, against the Western Christians, and at length drove them out of it. There are now no people known by this name, for the descendants of those who conquered Spain are called Moors.

SARACENS CONSOUND. The golden rod is sometimes so termed. See VIRGA AUREA.

SARAGOSSA, a city of Spain, capital of Arragon, and an archbishop's see, with a university, and a court of inquisition. It is said to have been built by the Phenicians; and the Romans sent a colony hither in the reign of Augustus, whence it had the name of Cæsarea Augusta, which by corruption has been changed into Saragossa. Here are many magnificent buildings, 17 large churches, and 14 handsome convents, beside others less considerable. The Ebro runs through the city, dividing it into two parts; and on its banks is a handsome quay, which serves for a public walk. The Holy-street is the largest, and so broad it may be taken for a square; and here they had their bull-fights. The cathedral is a spacious Gothic building; but the finest church is that of Nuestra Senora del Pilar, and a place of the greatest devotion in Spain. They tell us, that the Virgin, while yet living, appeared to St. James, who was preaching the gospel, and left him her image, with a handsome pillar of jasper. This image stands on a

marble pillar, with a little Jesus in her arms ornamented with a profusion of gold and jewels, and illuminated by a multitude of lamps and wax lights. The townhouse is a sumptuous structure; and in the hall are the pictures of all the kings of Arragon. Saragossa has no manufactures, and but little trade. It is seated in a large plain (where the Ebro receives two other rivers) which produces all kinds of fruit in great abundance. A victory was obtained here over the French and Spaniards in 1710, but it was abandoned by the allies soon after. In 1808 it sustained a siege by the French; but in another which lasted sixty-three days, the surviving besieged were obliged to surrender in Feb. 1809, being quite worn out by fighting, pestilence, and famine. During this memorable siege, the city was nearly demolished by the constant firing of an immense artillery, and of about forty thousand shells. It is 150 miles W. by N. of Barcelona, and 180 N.E. of Madrid. Lon. 0. 48 W. Lat. 41. 45 N.

SARBRUCK, a town of France, in the department of Sarre, lately of Germany, and the capital of a county of its name, belonging to the prince of Nassau-Sarbruck. Here is a handsome modern palace, and a magnificent Lutheran church. It stands on the W. side of the Sarre, 14 miles W. of Deux Ponts. Lon. 7. 5 E. Lat. 49. 16 N.

SA'RCASM. *s.* (*sarcasmus*, Latin.) A keen reproach; a taunt; a gibe (*Rogers*).

SARCA'STICAL. SARCA'STIC. *a.* (from *sarcasm.*) Keen; taunting; severe (*South*).

SARCA'STICALLY. *ad.* (from *sarcastical.*) Tauntingly; severely (*South*).

SA'RCENET. *s.* (*sericum saracenicum*, Latin, *Skinner.*) Fine thin woven silk (*Brown*).

To SA'RCLE. *v. a.* (*sarcler*, French.) To weed corn (*Ainsworth*).

SARCOCELE. (σαρκοκηλη; from σαρξ, flesh, and κηλη, a tumour.) Diseased testicle. This is a disease of the body of the testicle, and, as the term implies, consists, in general, in such an alteration made in the structure of it, as produces a resemblance to a hard fleshy substance, instead of that fine, soft, vascular texture, of which it is in a natural and healthy state composed.

The ancient writers have made a great number of distinctions of the different kinds of this disease, according to its different appearances, and according to the mildness or malignity of the symptoms with which it may chance to be attended. Thus, the sarcocele, the hydro-sarcocele, the scirrhus, the cancer, the caro adnata ad testem, and the caro adnata ad vasa, which are really little more than descriptions of different states and circumstances of the same disease, are reckoned as so many different complaints, requiring a variety of treatment, and deriving their origin from a variety of different humours.

Every species of sarcocele consists primarily in an enlargement, induration, and obstruction of the vascular part of the testicle; but this alteration is, in different people, attended with such a variety of circumstances, as to produce several different appearances, and to occasion the many distinctions which have been made.

If the body of the testicle, though enlarged, and indurated to some degree, be perfectly equal in its surface, void of pain, has no appearance of fluid in its tunica vaginalis, and produces very little uneasiness, except what is occasioned by its mere weight, it is usually called a simple sarcocele, or an indolent scirrhus; if, at the same time that the testis is enlarged and hardened, there be a palpable accumulation of fluid in the vaginal coat, the disease has by many been named a hydro-sarcocele; if the lower part of the spermatic vessels and the epidydimis were enlarged, hard, and knotty, they supposed it to be a fungous or morbid accretion, and called it the caro adnata ad vasa; if the testicle itself was unequal in its surface, but at the same time not painful, they distinguish it by the title of caro adnata ad testem; if it was tolerably equal, not very painful, nor frequently so, but at the same time hard and large, they gave it the appellation of an occult or benign cancer; if it was ulcerated, subject to frequent acute pain, to hæmorrhage, &c. it was known by that of a malignant or confirmed cancer. These different appearances, though distinguished by different titles, are really no more than so many stages (as it were) of the same kind of disease, and depend a great deal on several accidental circumstances, such as age, habit, manner of living, &c. It is true, that many people pass several years with this disease, under its most favourable appearances, and without encountering any of its worst; but, on the other hand, there are many, who, in a very short space of time, run through all its stages. They who are most conversant with it know how very convertible its mildest symptoms are into its most dreadful ones, and how very short a space of time often intervenes between the one and the other.

There is hardly any disease affecting the human body which is subject to more variety than this is, both with regard to its first manner of appearance, and the changes which it may undergo.

Sometimes the first appearance is a mere simple enlargement and induration of the body of the testicle; void of pain, without inequality of surface, and producing no uneasiness or inconvenience, except what is occasioned by its mere weight. And some few people are so fortunate to have it remain in this state for a very considerable length of time without visible or material alteration. On the other hand, it sometimes happens, that very soon after its appearance in this mild manner it suddenly becomes unequal and knotty, and is attended with very acute pains darting up to the loins and back, but still remaining entire, that is, not bursting through the integuments. Sometimes the fury of the disease brooks no restraint;

but, making its way through all the membranes which invelope the testicle, it either produces a large, foul, stinking, phagedenic ulcer, with hard edges, or it thrusts forth a painful gleeting fungus, subject to frequent hæmorrhage.

Sometimes an accumulation of water is made in the tunica vaginalis, producing that mixed appearance, called the hydro-sarcocele.

Sometimes there is no fluid at all in the cavity of the tunica vaginalis; but the body of the testicle itself is formed into cells, containing either a turbid kind of water, a bloody sanies, or a purulent fœtid matter. Sometimes the disorder seems to be merely local, that is, confined to the testicle, not proceeding from a tainted habit, nor accompanied with diseased viscera, the patient having all the general appearances and circumstances of health, and deriving his local mischief from an external injury. At other times, a pallid, leaden countenance, indigestion, frequent nausea, cholic pains, sudden purgings, &c. sufficiently indicate a vitiated habit, and diseased viscera, which diseased viscera may also sometimes be discovered and felt.

The progress, also, which it makes from the testis upward, toward the process, is very uncertain; the disease occupying the testicle only, without affecting the spermatic process, in some subjects, for a great length of time; while, in others, it totally spoils the testicle very soon, and, almost as soon, seizes on the spermatic chord.

SARCOCOLLA. (σαρκοκολλα, flesh-glue; from σαρξ, flesh, and κολλα, glue; because of its supposed powers of glueing together wounds.) A concrete gum-resinous juice supposed to be the produce of the penæa mucronata of Linnéus. It is brought from Persia and Arabia in small grains of a pale yellow colour, having also sometimes mixed with them a few of a deep red colour. Its taste is bitter, but followed with some degree of sweetness. It has been chiefly used for external purposes, and, as its name imports, has been thought to agglutinate wounds and ulcers; an opinion which, however, has long been relinquished. It was an ingredient in the pulvis e cerussa of the late edition of the London pharmacopœia.

SARCOLOGY. (σαρκολογια; from σαρξ, flesh, and λογος, a discourse.) The doctrine of the muscles and soft parts.

SARCOMA. (σαρκωμα; from σαρξ, flesh.) Sarcosis. A fleshy excrescence. A genus of disease in the class locales and order tumores of Cullen.

SARCOMPHALUS. (σαρκομφαλος; from σαρξ, flesh, and ομφαλος, the navel.) A fleshy excrescence about the navel.

SARCO'PHAGOUS. *a.* (σαρξ and φαγω.) Flesh-eating; feeding on flesh.

SARCOPHAGUS, in antiquity, a sort of stone coffin or grave, wherein the ancients laid those they had not a mind to burn. The word, as derived from the Greek, literally signifies flesh-eater; because at first they used a sort of stone for the making of tombs which quickly consumed the bodies. See the following article.

The sarcophagus in which the body of Alexander the Great was supposed to be entombed is one entire block of Egyptian marble, and is now in the British Museum, a prize for which we are principally indebted to the active and classical spirit of Dr. E. D. Clarke, of Cambridge. Some doubts, however, are entertained by the learned, as to this being the real tomb of Alexander; and as the question cannot be fully discussed in the space we could allot to the subject, we refer to Dr. Clarke's interesting dissertation on the Sarcophagus brought from Alexander, and to two able articles, one in the Edinburgh Review, vol. vii. pp. 480—502; the other in the Eclectic Review, vol. i. pp. 581—588.

SARCOPHAGUS, or LAPIS ASSIUS, in the natural history of the ancients, a stone much used among the Greeks in their sepultures, is recorded to have always perfectly consumed the flesh of human bodies buried in it in forty days. This property it was much famed for, and all the ancient naturalists mention it. There was another very singular quality also in it, but whether in all, or only in some peculiar pieces of it, is not known: that is, its turning into stone any thing that was put into vessels made of it. This is recorded only by Mutianus and Theophrastus, except that Pliny had copied it from these authors, and some of the later writers on these subjects from him. The account Mutianus gives of it is, that it converted into stone the shoes of persons buried in it, as also the utensils which it was in some places customary to bury with the dead, particularly those which the person while living most delighted in. The utensils this author mentions, are such as must have been made of very different materials; and hence it appears that this stone had a power of consuming not only flesh, but that its petrifying quality extended to substances of very different kinds. Whether ever it really possessed this last quality has been much doubted; and many, from the seeming improbability of it, have been afraid to record it. What has much encouraged the general disbelief of it is, Mutianus's account of its taking place on substances of very different kinds and textures; but this is no real objection, and the whole account has probably truth in it. Petrifactions in those early days might not be distinguished from incrustations of sparry and stony matter on the surfaces of bodies only, as we find they are not with the generality of the world even to this day; the incrustations of spar on mosses and other substances in some of our springs being at this time called by many petrified moss, &c. and incrustations like these might easily be formed on substances inclosed in vessels made of this stone, by water passing through its pores, dislodging from the common mass of the stone, and carrying with it particles of such spar as it contained; and afterwards falling in repeated drops on whatever lay in its way, it might again deposit them on such

substances in form of incrustations. By this means, things made of ever so different matter, which happened to be inclosed, and in the way of the passage of the water, would be equally incrusted with and in appearance turned into stone, without regard to the different configuration of their pores and parts.

The place from whence the ancients tell us they had this stone was Assos, a city of Lycia, in the neighbourhood of which it was dug; and De Boot informs us, that in that country, and in some parts of the East, there are also stones of this kind, which, if tied to the bodies of living persons, would in the same manner consume their flesh. Hill's notes on Theophrastus, p. 14.

SARCOPHYLLUM, in botany, a genus of the class diadelphia, order decandria. Calyx campanulate, five-parted, regular; legume scimitar-shaped, acute. One species only, a plant of the Cape of Good Hope.

SARCOSIS. See SARCOMA.

SARCOTICS. (from σαρκοω, to incarnate). Incarnants. Medicines that promote the growth of flesh in wounds.

SARCULATION. *s.* (*sarculus*, Lat.) The act of weeding; plucking up weeds.

SARDANAPALUS, the 40th and last king of Assyria, celebrated for his luxury and voluptuousness. The monarch generally appeared in the midst of his concubines disguised in the habit of a female, and spinning wool for his amusement. This effeminacy irritated his officers; Belesis and Arsaces conspired against him. Sardanapalus quitted his voluptuousness for a while, and appeared at the head of his armies. The rebels were defeated in three successive battles, but at last Sardanapalus was beaten and besieged in the city of Ninus. Despairing of success, he burned himself in his palace, with his eunuchs, concubines, &c. and his empire was divided among the conspirators, B. C. 820.

SARDINIA, an island of the Mediterranean, 142 miles from north to south, and 80 from east to west. The soil is fertile in corn, wine, oranges, citrons, and olives. On the coast is a fishery for anchovies and coral, of which large quantities are sent to Genoa and Leghorn. Beeves and sheep are numerous, as well as horses, which are good for labour and the road. They are fed in the little islands about it which abound in game; and in that of Asnaria are a great number of turtles. The air is very unhealthy, from the marshy land. Here are mines of silver, lead, sulphur, and alum; and they make a good deal of salt. This island has undergone various revolutions: in 1708 it was taken by the English for the emperor Charles VI.; and in 1720 ceded to the duke of Savoy, as an equivalent for that of Sicily. It was then erected into a kingdom; but his Sardinian majesty kept his court at Turin, the capital of his Piedmontese territories, until he was expelled from thence by the French in 1796. Cagliari is the capital.

SARDIS, or SARDES, a town of Asia Minor, the capital of the kingdom of Lydia, situate at the foot of mount Timolus, on the banks of the Pactolus. It is celebrated for the many sieges it sustained, and for the battle in which, B. C. 262, Antiochus Soter was defeated by Eumenes, king of Pergamus. It was destroyed by an earthquake in the reign of Tiberius, who ordered it to be rebuilt.

SARDOIN, in mineralogy, a species of the siliceous genus chalcedony, resembling white cornelian. See CHALCEDONIUS.

SARDONIC LAUGH. (*risus sardonicus*; so called from the herb sardonia, a kind of smallage which grows in the island of Sardonia, and is said to produce it.) A convulsive laughter. See RISUS SARDONICUS.

SARDONYX, in mineralogy, a species of chalcedony. See CHALCEDONIUS.

SARGEL, a seaport of Algiers, in the province of Mascara, with a castle; seated on the sea-coast, 25 miles S.S.W. of Algiers. Lon. 2. 15 E. Lat. 36. 30 N.

SARGUEMINE, a town of France, in the department of Moselle, seated on the Sarre, nine miles S. by E. of Sarbruck.

SARGUS, in ichthyology. See SPARUS.

SARK. *s.* (ɾcẏnk, Sax.) 1. A shark or shirk. 2. In Scotland it denotes a shirt (*Arbuthnot*).

SARK, a small island in the English channel, near the coast of France, and about two leagues E. from the island of Guernsey, on which it is dependant.

SARK, a river of Scotland, which rises in the central part of Dumfriesshire, and flows S. into Solway Frith. Its mouth forms a good harbour, at the village of Sarkfoot, eight miles E. by S. of Annan.

SARLOUIS, a strong town of France, in the department of Moselle, seated on the isthmus of a peninsula formed by the river Sarre, 32 miles N.E. of Metz. Lon. 6. 48 E. Lat. 49. 21 N.

SARMATIA, an extensive country at the north of Europe and Asia, divided into European and Asiatic. The European was bounded by the ocean on the north, Germany and the Vistula on the west, the Jazygæ on the south, and Tanais on the east. The Asiatic was bounded by Hyrcania, the Tanais, and the Euxine sea. The Sarmatians were a savage uncivilized nation, and generally lived on the mountains without any habitation.

SARMENTACEÆ, in botany. (*Sarmentum*, the twig or spray of a vine; from *sarpo*, to prune, which is from the Greek αρπω, and that from αρπη, a pruning-knife.) The name of the forty-ninth order in Linnéus's Fragments; and of the eleventh in his Natural Orders.

SARMENTOSE STEM, in botany. Sarmentosus caulis. Repens subnudus. Philos. Bot.—Filiformis geniculis radicantibus. Delin. Pl.—Filiform, almost naked; or having only leaves in bunches at the joints or knots, where it strikes root.—It seems to be in shrubs, what the runner is in herbaceous plants. See RUNNER and FLAGELLUM.

SARMENTOSÆ. (from *sarmentum*, a long shoot like that of a vine.) The name of the eleventh class in Linnéus's Fragments of a Natural Method, consisting of plants which have climbing stems and branches, that, like the vine, attach themselves to the bodies in their neighbourhood for the purpose of support. See BOTANY.

SARN. *s.* A British word for pavement, or stepping stones.

SARNEN, a town of Swisserland, capital of the canton of Underwalden, near a lake to which it gives name. It had formerly a strong castle, which was destroyed by the peasants in 1308. It is nine miles S. of Lucern. Lon. 8. 14 E. Lat. 46. 52 N.

SARNO, a town of Naples, in Principato Citeriore, seated on the Sarmo, near its source, 12 miles N.N.W. of Salerno, and 20 E.S.E. of Naples.

SAROS, a strong castle of Hungary, in a county of the same name, seated on the Tariza, at the foot of Mount Krapach, five miles N.N.W. of Eperies.

SAROTHRA, in botany, a genus of the class pentandria, order trigynia. Calyx five-parted; corol five-petalled; capsule one-celled, three-valved, coloured. One species, an annual of North America with branchy stem, subulate very minute leaves.

SARP, or SARPEN, a town of Norway, in the province of Christiansand. Near it is a great cataract, the noise of which may be heard at the distance of 20 miles. It is 10 miles W.S.W. of Frederickstadt.

SARPLAR OF WOOL, a quantity of wool, otherwise called a pocket or half sack; a sack containing 80 tod; a tod two stone; and a stone 14 pounds. In Scotland it is called sarpliath, and contains 80 stone.

SA'RPLIER. *s.* (*sarpilliere*, Fr.) A piece of canvas for wrapping up wares (*Bailey*).

SARRA, a town of Phœnicia, the same as Tyre. It receives this name from a shell-fish found in the neighbourhood, with whose blood garments were dyed. Hence came the epithet of Sarranus, so often applied to Tyrian colours.

SARRACENIA. Side-saddle plant. In botany, a genus of the class polyandria, order monogynia. Calyx double, the lower three-leaved, upper five-leaved; petals five; capsule five-celled; style with a shield-like stigma. Four species, all natives of America, the two following of which are cultivated.

1. S. flava. Yellow side-saddle flower. Leaves erect, tubular; valves with a contracted neck, and flat erect top; flowers on naked pedicels rising three feet from the root, of a green colour, appearing in June and July.

2. S. purpurea. Purple side-saddle flower. Leaves hooded, swelling, spreading, arched, hollow, narrow at the base, swelling at the top, rounded at the outside with a broad leafy border running down the tube on the inside; corol purple without, green within, with purple edges, the petals spoon-shaped. They are reared among ourselves with difficulty; and the better way to propagate them is to procure them from their natural boggy soil, with large balls of earth to their roots planted in tubs of earth. When imported they should be removed into large pots filled with soft spongy earth, mixed with rotten wood, moss and turf, which is a good imitation of its natural soil; in the winter they will require the shelter of a frame, and in summer of a shade.

SARRE, a new department of France, including part of the late electorate of Treves and duchy of Deux Ponts. It has its name from a river which rises near Salm, in the department of Meurte, flows N. by Sarbruck and Sarburg, and joins the Moselle, a little above Treves. The capital is Treves.

SARSAPARILLA. (This word is of Spanish origin, signifying a red tree.) The root of this plant, smilax sarsaparilla of Linnéus, (smilax caule aculeato angulato, foliis inermibus ovatis retuso-mucronatis trinerveis. C. O. Dioecia. Hexandria), has a farinaceous, somewhat bitter taste, and no smell. About two centuries ago it was introduced into Spain as an undoubted specific in syphilitic disorders; but owing to difference of climate, or other causes, it has not answered the character which it had acquired in the Spanish West Indies. It is now considered as capable of improving the general habit of body after it has been reduced by the continued use of mercury. See SMILAX.

To refute the opinion that sarsaparilla possesses antisyphilitic virtues, Mr. Pearson, of the Lock Hospital, divides the subject into two distinct questions. 1. Is the sarsaparilla root, when given alone, to be safely relied on, in the treatment of lues venerea? The late Mr. Bloomfield, his predecessor and during some years his colleague, at the Lock Hospital, has given a very decided answer to this question: "I solemnly declare," says he, "I never saw a single instance in my life where it cured that disorder, without the assistance of mercury, either at the same time with it, or when it had been previously taken before the decoction was directed." Mr. Pearson's experience, during many years, coincides entirely with the observations of Mr. Bloomfield. He has employed the sarsaparilla, in powder and in decoctions, in an almost infinite variety of cases, and feels himself fully authorised to assert, that this plant has not the power of curing any one form of the lues venerea. The sarsaparilla, indeed, like the guaicum, is capable of alleviating symptoms derived from the venereal virus; and it sometimes manifests the power of suspending, for a time, the destructive ravages of that contagion; but where the poison has not been previously subdued by mercury, the symptoms will quickly return; and, in addition to them, we often see the most indubitable proofs that the disease is making an actual progress, during the regular administration of the vegetable remedy.

2. When the sarsaparilla root is given in conjunction with mercury, does it render the mercurial course more certain and efficacious? In replying to this query, it is necessary to ob-

serve, that the phrase, " to increase the efficacy of mercury," may imply, that a smaller quantity of this mineral antidote will confer security on an infected person, when sarsaparilla is added to it; or it may mean, that mercury would be sometimes unequal to the cure, without the aid of sarsaparilla. If a decoction of this root did indeed possess so admirable a quality, that the quantity of mercury necessary to effect a cure might be safely reduced, whenever it was given during a mercurial course, it would form a most valuable addition to our materia medica. This opinion has been, however, unfortunately falsified by the most ample experience, and whoever shall be so unwary as to act upon such a presumption, will be sure to find his own and his patient's expectations egregiously disappointed.

If the sarsaparilla root be a genuine antidote against the syphilitic virus, it ought to cure the disease when administered alone; but, if no direct proof can be adduced of its being equal to this, any arguments founded on histories where mercury has been previously given, or where both the medicines were administered at the same time, must be ambiguous and undecisive.

It appears probable, that sir William Fordyce, and some other persons, entertained a notion, that there were certain venereal symptoms which commonly resisted the potency of mercury, and that the sarsaparilla was an appropriate remedy in these cases. This opinion, it is presumed, is not correct, for it militates against all Mr. P. has ever observed of the progress and treatment of lues venerea. Indeed those patients who have lately used a full course of mercury, often complain of nocturnal pains in their limbs; they are sometimes afflicted with painful enlargements of the elbow and knee joints; or they have membranous nodes, cutaneous exulcerations, and certain other symptoms, resembling those which are the offspring of the venereal virus.

It may and does often happen, that appearances like these are mistaken for a true venereal affection, and, in consequence of this error, mercury is administered, which never fails to exasperate the disease. Now, if a strong decoction of sarsaparilla root be given to persons under these circumstances, it will seldom fail of producing the most beneficial effects; hence it has been contended, that symptoms derived from the contagion of lues venerea, which could not be cured by mercury, have finally yielded to this vegetable remedy. It must be acknowledged, that representations of this kind have a specious and imposing air; nevertheless, Mr. Pearson endeavours to prove, that they are neither exact nor conclusive. If any of the above-named symptoms should appear near the conclusion of a course of mercury, when that medicine was operating powerfully on the whole system, it would be a strange and inexplicable thing if they could possibly be derived immediately from the uncontrolled agency of the venereal virus.

This would imply something like a palpable contradiction, that the antidote should be operating with sufficient efficacy to cure the venereal symptoms, for which it was directed; while, at the same time, the venereal virus was proceeding to contaminate new parts, and to excite a new order of appearances.

One source, and a very common one, to which some of the mistakes committed upon this subject may be traced, is a persuasion that every morbid alteration which arises in an infected person is actually tainted with the venereal virus, and ought to be ascribed to it as its true cause.

Every experienced surgeon must, however, be aware, that very little of truth and reality exists in a representation of this kind. The contagious matter, and the mineral specific, may jointly produce, in certain habits of body, a new series of symptoms, which, strictly speaking, are not venereal, which cannot be cured by mercury, and which are sometimes more to be dreaded than the simple and natural effects of the venereal virus.

Some of the most formidable of these appearances may be sometimes removed by sarsaparilla, the venereal virus still remaining in the system; and when the force of that poison has been completely subdued by mercury, the same vegetable is also capable of freeing the patient from what may be called the sequelæ of a mercurial course.

The root of the sarsaparilla is sometimes employed in rheumatic affections, scrofula, and cutaneous complaints, where an acrimony of the fluids prevail.

SARSAPARILLA GERMANICA. The root of the carex arenaria of Linnæus, which grows plentifully on the sea-coast, is so termed, and it appears that the carex disticha and hirta have also been collected, and their roots used indifferently instead of the true sarsaparilla. The root of the carex arenaria has been found serviceable in some mucal affections of the trachea, in rheumatic pains, and gouty affections.

SARSE. *s.* A sort of fine lawn sieve.

To SARSE. *v. a.* (*sasser*, Fr.) To sift through a sarse or searse (*Bailey*).

SARTORIUS. (from *sartor*, a taylor, because taylors cross their legs with it.) This flat and slender muscle, which is the longest of the human body, and from an inch and a half to two inches in breadth, is situated immediately under the integuments, and extends obliquely from the upper and anterior part of the thigh to the upper, anterior, and inner part of the tibia, being inclosed by a thin membranous sheath, which is derived from the adjacent fascia lata. It arises, by a tendon of about half an inch in breadth, from the outer surface and inferior edge of the anterior superior spinous process of the ilium, but soon becomes fleshy, and runs down a little way obliquely inwards, and then for some space upon the rectus, nearly in a straight direction; after which it passes obliquely over the vastus internus, and the lower part of the adductor longus, and then

running down between the tendons of the adductor magnus and the gracilis, is inserted, by a thin tendon, into the inner part of the tibia, near the inferior part of its tuberosity, and for the space of an inch or two below it. This tendon sends off a thin aponeurosis, which is spread over the upper and posterior part of the leg. This muscle serves to bend the leg obliquely inwards, or to roll the thigh outwards, and at the same time to bring one leg across the other, on which account Spigelius first gave it the name of sartorius, or the taylor's muscle.

SARUM (New). See SALISBURY.

SARUM (Old), an ancient borough in Wilts, which, though now reduced to a single farm-house, sends two members to parliament. It once covered the summit of a steep hill, and was strongly fortified; but nothing is to be seen except the ruins and traces of the walls. It is a little to the north of Salisbury.

SASH. *s.* (from *sçache*, of *sçavoir*, to know, a sash being a mark of distinction.) 1. A belt worn by way of distinction; a silken band worn by officers in the army. 2. A window so formed as to let up and down by pullies.

SASH, as a mark of distinction, in the British service is generally made of crimson silk for the officers, and of crimson mixed with white cotton for the serjeants. It is worn round the waist in most regiments; in some few, particularly in the Highland corps, it is thrown across the shoulder. Sashes were originally invented for the convenience and ease of wounded officers, &c. by means of which, in case any of them were so badly wounded as to render them incapable of remaining at their posts, they might be carried off with the assistance of two men. They are now reduced to a very small size, and of course unfit for the original purpose. Both the sash and gorget, indeed, must be considered as mere marks of distinction, to point out officers on duty. In some instances they are worn together; in others, the gorget is laid aside, and the sash only worn. The British cavalry tie the sash on the right, the infantry on the left, side. The sashes for the imperial army are made of crimson and gold, for the Prussian army black silk and silver, the Hanoverians yellow silk, the Portuguese crimson silk with blue tassels. The modern French have their sashes made of three colours, viz. white, pink, and light-blue, to correspond with the national flag.

SA'SHOON. *s.* A kind of leather stuffing put into a boot for the wearer's ease (*Ainsworth*).

SASSA. See MYRRH and OPOCALPASUM.

SASSAFRAS. (*quasi saxafraga*, from *saxum*, a stone, and *frango*, to break; so called because a decoction of its wood was supposed good for the stone.) The wood of the sassafras tree, laurus sassafras of Linnæus, (lauris foliis trilobis integrisque. C. O. Enneandria. Monogynia), is imported from North America in long straight pieces, very light, and of a spongy texture, and covered with a rough fungous bark. It has a fragrant smell, and a sweetish, aromatic, sub-acrid taste; the root, wood, and bark agree in their medical qualities, and are all mentioned in the pharmacopœias; but the bark is the most fragrant, and thought to be more efficacious than the woody part, and the branches are preferred to the large pieces. The medical character of this drug was formerly held in great estimation, and publications were professedly written on the subject. It is now, however, thought to be of very little importance, and seldom used but in conjunction with other medicines, as a corrector of the fluids. It is an ingredient in the decoctum sarsaparillæ compositum; but the only officinal preparation of it is the essential oil, which is carminative and stimulant. See LAURUS.

SAT. The preterit of *sit*.

SATALIA, or ANTALIA, a strong seaport of Asiatic Turkey, in Caramania. It is divided into three towns, and has a superb mosque, which was formerly a church. The country around is very fertile; and the citrons and oranges are extremely fine. The chief trade is in wool, cotton, goats hair, agaric, tragacanth, opium, and bees wax. It is seated on a gulf of the Mediterranean, to which it gives name, 150 miles S.W. of Cogni. Lon. 31. 21 E. Lat. 37. 1 N.

SATAN, a Hebrew word which signifies an adversary, or an accuser. See DEVIL.

SATA'NICAL. SATA'NIC. *a.* (from *Satan*, the prince of hell.) Devilish; infernal.

SA'TCHEL. *s.* (*seckel*, German; *sacculus*, Lat.) A little bag: commonly a bag used by schoolboys (*Swift*).

To SATE. *v. a.* (*satio*, Latin.) To satiate; to glut; to pall; to feed beyond natural desires.

SATELLITE. (*satelles*, guard.) A person attending on another, either for his safety, or to be ready to execute his pleasure.

Among the eastern emperors, satellite originally expressed the dignity, or office, of captain of the life-guard.

The term was afterwards applied to the vassals of lords; and afterwards to such as held fees, called sergeanties. See SERGEANTY.

SATELLITES, in astronomy, certain secondary planets, moving round the other planets, as the moon does round the earth; they are thus called, because always found attending them, from rising to setting, and making the tour of the sun together with them.

The satellites move round their primary planets, as their centres, by the same laws as those primary ones do round their centre the sun.

The words moon and satellite are sometimes used indifferently; and thus we say, either Jupiter's moons or Jupiter's satellites; but, ordinarily, we distinguish; restraining the term moon to the earth's satellite; and satellite to the little moons more lately discovered about Jupiter, Saturn, &c.

The number of satellites at present known in our system is eighteen; namely, the moon

which revolves round the earth, four that belong to Jupiter, seven to Saturn, and six to Herschel or Uranus. The moon is the only one that is visible to the naked eye.

Besides what we have already given from Schroeter and others under the word MOON, we shall here present the accurate results of Laplace, abridged from his Exposition of the System of the World.

Moon.

The motions of the moon are exceedingly eccentric and irregular. She performs her mean sidereal revolution in $27^d\ 7^h\ 43'\ 11'',5$. But this period is variable: and a comparison of the modern observations with the ancient proves incontestably an acceleration in her mean motion. Her mean tropical revolution is $27^d\ 7^h\ 43'\ 4'',7$: and her mean synodical revolution is $29^d\ 12^h\ 44'\ 2'',8$.

Her mean distance from the earth is 29·982175 times the diameter of the terrestrial equator; or above 237 thousand miles.

The eccentricity of her orbit is ·0548553; the mean distance from the earth being taken equal to unity. But this eccentricity is variable in each revolution.

Her mean longitude, at the commencement of the present century, was in $3^s\ 21°\ 36'\ 42'',1$.

Her velocity varies in different parts of her orbit. She is swiftest in her perigee (or point nearest the earth); and slowest when in her apogee (or point furthest from the earth). Her mean diurnal velocity is equal to $13°\ 10'\ 34'',9$, or about 13 times greater than that of the sun.

The greatest equation of her centre is $6°\ 17'\ 54'',5$.

The mean longitude of her perihelion was, at the commencement of the present century, in $8^s\ 26°\ 6'\ 5'',1$: but the line of the apsides has a motion, according to the order of the signs. The period of a sidereal revolution of the apsides is $3232^d\ 13^h\ 56'\ 16'',8$, or nearly 9 years. The period of a tropical revolution of the apsides is but $3231^d\ 11^h\ 24'\ 8'',6$. But these periods are not uniform: for they have a secular irregularity, and are retarded whilst the motion of the moon itself is accelerated. The period of an anomalistic revolution of the moon is $27^d\ 13^h\ 18'\ 37'',4$.

Her orbit is inclined to the plane of the ecliptic in an angle of $5°\ 9'$; but this inclination is variable. The greatest inequality, which sometimes extends to $8'\ 47'',1$, is proportional to the co-sine of the angle on which the inequality in the motion of the nodes depends.

Her orbit, at the commencement of the present century, crossed the ecliptic in $0^s\ 15°\ 55'\ 26'',3$: but the place of her nodes is variable. They have a retrograde motion, and make a sidereal revolution in $6793^d\ 10^h\ 6'\ 30'',0$; or in about 18·6 Julian years. This variation, however, is subject to many inequalities; of which, the greatest is proportional to the sine of double the distance of the moon from the sun; and extends to $1°\ 37'\ 45'',0$ at its maximum. A synodical revolution of the nodes is performed in $346^d\ 14^h\ 52'\ 43'',6$. The motion of the nodes is subject also to a secular inequality, dependent on the acceleration of the moon's mean motion.

The rotation of the moon on her axis is equal and uniform: and it is performed in the same time as the tropical revolution in her orbit; whence she always presents nearly the same face to the earth. But, as the motion of the moon, in her orbit, is periodically variable, we sometimes see more of her eastern edge, and sometimes more of her western edge. This appearance is called the libration of the moon in longitude.

The axis of the moon is inclined to the plane of the ecliptic in an angle of $88°\ 29'\ 49''$. In consequence of this position of the moon, her poles alternately become visible to, and obscured from us; and this phænomenon is called her libration in latitude.

There is also another optical deception arising from the moon being seen from the surface of the earth, instead of the centre. This appearance is called her diurnal libration.

There are other inequalities in the moon's motion, arising from the action and influence of the sun. The principal of these are,

1. The evection; whose constant effect is to diminish the equation of the centre in the syzigies, and to augment it in the quadratures. If this diminution and increase were always the same, the evection would depend only on the angular distance of the moon from the sun; but its absolute value varies also with the distance of the moon from the perigee of its orbit. After a long series of observations, we are enabled to represent this inequality by supposing it equal to the sine of double the distance of the moon from the sun, minus the distance of the moon from its perigee. At its maximum, it amounts to $1°\ 18'\ 2'',4$.

2. The variation; which disappears in the syzigies and quadratures, and is greatest in the octants. It is then equal to $31'\ 44'',1$: whence it is proportional to the sine of double the distance of the moon from the sun. Its duration is half a synodical revolution of the moon.

3. The annual equation; which follows exactly the same law as the equation of the centre of the sun, with a contrary sign. For, when the earth is in its perihelion, the orbit of the moon is enlarged by the action of the sun; and the moon therefore requires more time to perform her revolution. But, as the earth proceeds towards its aphelion, the moon's orbit contracts. Hence the period of this inequality is an anomalistic year; and, at its maximum, it amounts to $11'\ 15'',9$. It is subject to a secular inequality.

The figure of the moon is that of an oblate spheroid, like the earth. Her mean diameter is in the proportion to that of the earth, as 5823 to 21332; or as 1 to 3·665. Whence her mean diameter will be about 2160 miles.

Her volume, compared with that of the earth, is $\frac{1}{49}$: but her mass is only $\frac{1}{68 \cdot 1}$.

The apparent diameter of the moon varies according to her distance from the earth. When nearest to us it is 33′ 31″,1; but at her greatest distance it is 29′ 21″,9. Her mean apparent diameter is 31′ 26″,5.

Her mean horizontal parallax is equal to 57′ 34″,2.

The phases of the moon are caused by the reflection of the sun's light; and depend on the relative positions of the sun, the earth, and the moon.

An eclipse of the moon can take place only at the time of her opposition to the sun; and is caused by her passing through the shadow of the earth. That shadow is $3\frac{1}{2}$ times longer than the distance between the moon and the earth: and its breadth, where it is traversed by the moon, is about $2\frac{3}{4}$ times greater than the diameter of the moon. The breadth of the earth's shadow, where it is traversed by the moon, is equal to the difference between the semidiameter of the sun, and the sum of the horizontal parallaxes of the sun and moon.

[The moon cannot be eclipsed, however, if her distance from the place of her node, at the time of her opposition, exceeds 13° 21′: but, if it is within 7° 47′, there will certainly be an eclipse. The duration of the eclipse will depend on the apparent diameter of the moon, and on the breadth of the shadow at the point where she traverses it.]

The sun cannot be eclipsed unless the moon be in conjunction; and then only when the centres of the sun and moon are in the same straight line with the eye of the spectator on the earth. In such case, if the apparent diameter of the moon be greater than that of the sun, the eclipse will be total; but, if it be less, it will be annular. Partial eclipses, however, may arise; as in the case of lunar eclipses.

[The sun cannot be totally obscured for a longer period of time than four minutes; but the moon may be hid from our view for a much longer period.

[The number of eclipses in a year cannot be less than two, nor more than seven.]

Eclipses generally return in the same order and magnitude at the end of 223 lunations. For in 223 mean synodical revolutions, there are 6585^d 7^h 42′ 31″,7; and in 6585^d 18^h 41′ 45″,6 there are 19 mean synodical revolutions of the moon's nodes. Therefore at the end of 6585^d 7^h 42′ 31″,7, the moon's mean longitude will be only 28′ 32″ behind the mean place of her nodes. In 6585 days there are 18 Julian years and 11 days, if there are four leap years in that period; but if there are five leap years, they form no more than 18 Julian years and 10 days.

The atmosphere of the moon, if it has any, must be extremely attenuated; and must be more rare than that which we can produce with our best air pumps.

The light of the moon is 300,000 times more weak than that of the sun. Its rays, collected by the aid of powerful glasses, do not produce any sensible effect on the thermometer.

The refraction of the rays of light, at the surface of our earth, must be at least 1000 times greater than at the surface of the moon.

Volcanoes and mountains are discovered on her surface, by the aid of the telescope.

A body projected from the surface of the moon, with a momentum that would cause it to proceed at the rate of about 8200 feet in the first second of time, and whose direction should be in a line which at that moment passed through the centre of the earth and moon, would not fall again to the surface of the moon; but would become a satellite to the earth. Its primitive impulse might, indeed, be such as to cause it even to precipitate to the earth. The stones, which have fallen from the air, may be accounted for in this manner.

Satellites of Jupiter.

By the aid of the telescope we may discover four satellites revolving round Jupiter. The sidereal revolutions of these bodies are given in the following table: together with their mean distances from Jupiter, the semi-diameter of that planet's equator being considered as unity; and likewise their masses, compared with Jupiter considered also as unity.

Satellite.	Sidereal Revolution.	Mean Distance.	Mass.
I.	1^d 18^h 27′ 33″,5	1^d 769137788148	5·812964	·0000173281
II.	3 13 13 42 ,0	3 551181017849	9·248679	·0000232355
III.	7 3 42 33 ,4	7 154552783970	14·752401	·0000884972
IV.	16 16 31 49 ,7	16 688769707084	25·946860	·0000426591

First satellite.—The inclination of the orbit of this satellite does not differ much from the plane of Jupiter's orbit. Its eccentricity is insensible.

Second satellite.—The eccentricity of the orbit of this satellite is also insensible. The inclination of its orbit, to that of its primary, is variable; as well as the position of its nodes.

Third satellite.—This satellite has a little eccentricity; and the line of its apsides has a direct but variable motion; the eccentricity itself is also subject to very sensible variations. The inclination of its orbit to that of Jupiter, and the position of its nodes, are far from being uniform.

Fourth satellite.—The eccentricity of this

satellite is greater than that of any of the other three; and the line of the apsides has an annual and direct motion of 42′ 58″,7. The inclination of its orbit, with the plane of Jupiter's orbit, forms an angle of about 2° 25′ 48″; but this angle, although stationary about the middle of the last century, has lately begun to increase very sensibly. At the same time the motion of its nodes has begun to diminish.

The motions of the first three satellites are related to each other by a most singular analogy. For the mean sidereal or synodical motion of the first, added to twice that of the third, is constantly equal to three times the mean motion of the second. And the mean sidereal or synodical longitude of the first, minus three times that of the second, plus twice that of the third, is always equal to two right angles.

The satellites of Jupiter are liable to be eclipsed by passing through his shadow; and, on the other hand, they are frequently seen to pass over his disk, and eclipse a portion of his surface. This happens, to the first and second satellite, at every revolution: the third very rarely escapes in each revolution; but the fourth (on account of its great distance and inclination) is seldom obscured.

These eclipses are of great utility in enabling us to determine the longitude of places, by their observation; and they likewise exhibit some curious phænomena with respect to light.

From the singular analogy, above alluded to, it follows that (for a great number of years at least) the first three satellites cannot be eclipsed at the same time; for in the simultaneous eclipses of the second and third, the first will always be in conjunction with Jupiter; and *vice versâ*.

Satellites of Saturn.

Seven satellites may be seen, by means of the telescope, to revolve about Saturn; the elements of which are but little known, on account of their great distance. The following table will show the duration of their sidereal revolutions, and their mean distances in semi-diameters of Saturn.

Satellite.	Sdiereal Revolution.		Mean Distance.
I.	0d 22h 37′ 30″,1	0d 94271	3·080
II.	1 8 53 8 ,7	1 37024	3·952
III.	1 21 18 25 ,9	1 88780	4·893
IV.	2 17 44 51 ,1	2 73948	6·268
V.	4 12 25 11 ,1	4 51749	8·754
VI.	15 22 41 13 ,9	15 94530	20·295
VII.	79 7 54 37 ,4	79 32960	59·154

The orbits of the first six satellites appear to be in the plane of Saturn's ring; whilst the seventh varies from it very sensibly.

Satellites of Uranus.

Six satellites revolve round Uranus; which, together with their primary, can be discovered only by the telescope. The following table will show their sidereal revolutions, and mean distances in semi-diameters of the primary.

Satellite.	Sidereal Revolution.		Mean Distance.
I.	5d 21h 25′ 20″,6	5d 8926	13·120
II.	8 16 57 47 ,5	8 7068	17·022
III.	10 23 3 59 ,0	10 9611	19·845
IV.	13 10 56 29 ,8	13 4559	22·752
V.	38 1 48 0 ,0	38 0750	45·507
VI.	107 16 39 56 ,2	107 6944	91·008

All these satellites move in a plane which is nearly perpendicular to the plane of the planet's orbit, and contrary to the order of the signs!

Satellite of Venus.

Cassini thought he saw one, and Mr. Short and other astronomers have suspected the same thing. (Hist. de l'Acad. 1741, Philos. Trans. numb. 459). But the many fruitless searches that have been since made to discover it, leave room to suspect that it has been only an optical illusion, formed by the glasses of telescopes; as appears to be the opinion of F. Hell, at the end of his Ephemeris for 1766, and Boscovich, in his 5th Optical Dissertation. See also Baxter's Matho, vol. ii. pa. 89, 90.

SATELLITE VEINS. The veins which accompany the brachial artery as far as the bend of the cubit.

SATELLI'TIOUS. *a.* (from *satelles*, Lat.) Consisting of satellites (*Cheyne*).

To SA'TIATE. *v. a.* (*satio*, Latin.) 1. To satisfy; to fill (*Philips*). 2. To glut; to pall; to

fill beyond natural desire (*Norris*). 3. To gratify desire (*K. Charles*). 4. To saturate; to impregnate with as much as can be contained or imbibed (*Newton*).

SATIATE. *a.* (from the verb.) Glutted; full to satiety (*Pope*).

SATIETY. *s.* (*satietas*, Latin.) Fulness beyond desire or pleasure; more than enough; wearisomeness of plenty; state of being palled or glutted.

SATIMANGALAM, a town of Hindustan, in the province of Coimbetore, with a large stone fort, and a considerable temple. It has manufactures of cotton cloths, and a great trade to Seringapatam. It is seated near the Bhawani, 30 miles W. of Bhawanikudal, and 75 S.S.E. of Seringapatam.

SATIN, a glossy kind of silk stuff, the warp of which is very fine, and stands out so as to cover the coarser woof. Some satins are quite plain, others wrought; some flowered with gold or silver, and others striped, &c. The Chinese satins are most valued, because of their cleaning and bleaching easily, without losing any thing of their lustre; in other respects they are inferior to those of Europe.

SATIN FLOWER. See LUNARIA.

SATIN-SPAR, in mineralogy, a species of the calcareous genus INOLITHUS, which see.

SATIRE, in literature, a term which signifies all manner of discourse wherein any person is reprehended; but more particularly a poem, wherein men's follies and vices are wittily exposed, in order to their reformation.

SATIRE (Proper), is distinguished by the generality of its reflections from a lampoon, which is aimed at a particular person; but they are frequently confounded.

The origin of the word has been the occasion of considerable dispute among the critics. The common opinion supported by Scaliger, Heinsius and Vossius, deduces it from the Greek Σατυροι, Satyrs, a sort of Sylvan deities, by the Romans called Fauni, to whose petulancy and wantonness this sort of composition is supposed to bear some resemblance. On which footing satire is considered as a poem of a wanton and licentious nature, which, like the Satyrs, turns things upside down to find occasion for censure and ridicule.

Casaubon, on the contrary, followed by Spanheim and Dacier, derives the Roman satyr from the Latin *satur*, used for *plenum*, full, a thing to which nothing is wanting; whence came *satura*, written also *satira*, which, being an adjective, refers to a substantive understood, viz. *lanx*; *satura lanx* being the name of a bason filled with all manner of fruits, which the Romans offered yearly to Ceres and Bacchus as their first fruits.

The word satura was afterwards applied to other mixtures, and at length transferred to works of genius; thus *leges saturæ* denoted laws consisting of many heads or titles. Upon the whole, it is inferred, that the satirical pieces of the poets were so called, as being various and miscellaneous compositions; on this principle it is urged, that the word should be written in Latin with an *u* or *i*, and in English only with an *i*, whereas those who write it with a *y*, do it on the supposition that the sylvan Satyri gave name to this composition, which Casaubon endeavours to disprove by shewing, that from *satyrus* must be formed *satyrica*, and not *satyra*, and by explaining the great difference between the Greek satyric poems and the Roman satire.

However, satirical poetry, according to Scaliger, may be naturally enough deduced from the wantonness of the satyrs; and this opinion is confirmed by considering that σαλυρικὸς is rendered in ancient glosses by *ludio*, and satirical by ludicrous, sportive, &c. Thus Seneca's satire is called *ludus*, and Horace and Persius use *ludere* for *scribere satyras*.

Satire bears a near affinity to raillery, ridicule, lampoon, libel, &c., and stands opposed to panegyric. The reason why satires generally please, and panegyrics tire the readers, seems to be, because the former are commonly true, and the latter false.

Horace calls his two books of satires indifferently either *sermones* or *satyræ*, two words which at first sight present very different ideas.

The chief satirists among the ancients are, Horace, Juvenal, and Persius; among the moderns, Regnier, and Boileau in French; and Dryden, Oldham, Rochester, Buckingham, Wycherly, Pope, Young, Churchill, Cowper, &c. among the English.

A satire ought to be lively, pleasant, moral, and full of variety; in these respects Juvenal and Horace excelled, though their satires ought not to be read without caution. Among the qualifications requisite in a satirist, one of the most essential is good-nature; all the sentiments which are beautiful in this way of writing must proceed from that quality in the author. Good-nature produces that disdain of all baseness, vice and folly, which prompts the poet to express himself with smartness against the errors of men, but without any bitterness towards their persons. It is this equality which keeps the mind in equanimity, and never lets an offence unseasonably throw a man out of his character.

In all the writings of Horace and Juvenal, there is not one ill-natured expression; not one sentence of severity which does not apparently proceed from the contrary disposition. Tatler, No. 242.

Satire may be divided with regard to the measure, and kind of verse, as well as the manner of the poem, and the character, into the narrative, dramatic, mixed, &c.

Narrative, is a simple narration or recital of abuses in the poet's own person. Such is the first of Juvenal.

Dramatic, is that wherein several persons discourse together, whether they be nameless, as in the first of Persius, or have names, as of Catius and Damasippus.

Mixt is a compound of both the former; as that fine one of Horace, *Ibam forte via sacra*.

Grave, and animated, which inveigh with warmth and earnestness against corruption, and

vice in every shape: as those of Juvenal and Persius.

Sportive, and lighter, which seem to play with men's follies, but in playing, omit no opportunity of making them feel the lash. Such are those of Horace, which are hence said to be *sermoni propiora*.

The grave sort brandishes a naked sword; the sportive presents a thyrsus, like that of the ancient satyrs surrounded with vine leaves, with which it stabs unawares. The heat of the former sometimes degenerates into fury and indignation; and the calmness of the latter sometimes sinks into mere raillery; but between the two extremes are many intermediate species and degrees. The former, especially when dictated by passion, is much the easiest; nothing is more difficult than to make people of taste laugh, even at the expence of others. The attainment of this must be the fruit of genius and talents rather than of rules; perhaps it may be unnecessary to explain either, since vanity, self-love, and even malice are masters, more than sufficient for a poet who wants not wit and judgment. Thus Juvenal, *si natura negat, facit indignatio versum*; and Boileau, *La colere suffit et vaut un Apollon.*

Satire is divided into general, which is levelled at common abuses wherein numbers are equally interested; and personal, which points out and exposes particular characters, more properly called lampoon. This last, as it affects men's reputation, on which their interest greatly depends, is scarce distinguishable from defamation and scandal.

To this last class belong most of those which bear the title of *anti*; as the Anti-Baillet of Menage, with which M. Baillet was so stung, that he composed a treatise express on personal satires, which bear the title *anti*; to shew the immorality and unlawfulness of them, and their contrariety to the precepts of the Gospel.

It is farther objected to this kind of satire, that a public detection, far from producing the effect it is designed for, reformation, is apt to drive men to desperation, and harden them in their course. The excellent author of the Treatise of the Government of the Tongue, speaking of uncharitable truths, says, a discovery of this kind serves not to reclaim, but only to enrage the offender, and precipitate him into farther degrees of ill. Modesty, and fear of shame, is one of those natural restraints which the wisdom of heaven has put on mankind; and he, who once stumbles, may yet, by a check of that bridle, recover himself again. But when, by a public detection, he is fallen under that infamy he feared, he will be then apt to discard all caution, and to think he owes himself the utmost pleasures of vice at the price of his reputation: nay, perhaps, he advances farther, and sets up for a reversed sort of fame, by being eminently wicked: thus he, who before was but a clandestine disciple, becomes a doctor of impiety. Doubtless it was this sort of reasoning that induced our wise legislators lately to repeal the law which put the brand of infamy in the face of felons. In effect, where crimes are enormous, the delinquent deserves little pity, yet the reporter may deserve less. Vide Tatler, No. 74, 76.

Considering satire most favourably, not as the effusion of personal animosity, but as an attempt to expose vice and folly to indignation and contempt, we are inclined to think it is rarely innocent. The exercise of ridicule implies in the satirist, and excites in his reader, a contemptuous feeling, composed of pride and mirth; that of invective, implies and excites an indignant feeling, composed of pride and malice; and however faint and harmless these feelings may appear in single instances, and on just occasions, the character which they induce on the mind by frequent recurrence is neither dubious nor amiable. The mob, which has been assisting with stones and mud at an exhibition on the pillory, returns perhaps with strong feelings of contempt or indignation against some particular crime; but we cannot applaud such an attack, even on vice, nor recommend such an employment as a salutary discipline for the heart.

If the innocence of satire be doubtful, we are still more inclined to question its efficacy. We will not affirm that it has been wholly useless in combating the follies and delusions of mankind. It may have abated some nuisances in literature, and reformed some offences against taste; it may have rectified some little absurdities in dress and manner; and assisted in demolishing the reverence for monks, the spirit of knight-errantry, and the devotedness to a corrupt and despotic priesthood. These absurdities were easy to overcome; to expose, was to defeat them: they had no hold on the passions and appetites, they maintained their power injuriously to the public interest, under a temporary cover of ignorance, and were vanquished by a gleam of light: they were not the canker at the heart of a flower, but the caterpillar on its leaf. The follies of men, however, are so volatile and fantastic, they are so ready to vanish spontaneously, and re-appear in new shapes, that the touch of satire is scarcely needed to anticipate their destiny; it is unable to extinguish their essential being, and can only pretend to hasten that metamorphosis, which might otherwise have waited a little for the lapse of time. But the vices derive their influence, not from novelty or accident, but from the most powerful and permanent propensities of human nature; they maintain it, not by favour of ignorance, but against convictions of interest and sentiments of obligation. The vice which has resisted them all, is invulnerable to the wrath or the ridicule of a satirist; he cannot make it appear more odious than it is known to be, by any poetical association of circumstances or aggravation of phrase; nor propose any motives to virtue, which conscience or policy has not often suggested in vain.

Should it, however, be admitted, that the vicious are not accustomed to surrender their favourite gratifications at the summons of a speculative satirist, yet personal satire may still be supposed to have its use, to deter the delin-

quent from repeating, or the tempted from committing a crime, by the prospect of exposure and public scorn. To condemn the vicious may be effectual, where it is useless to condemn vice. The experiment has been tried, by the early comic writers of Athens and others. Yet we do not hear that the ridicule of Aristophanes reformed or banished any culprit, or corrected the licentiousness of the Athenian manners; but we do remember that a venerable and innocent sage was the victim of this hopeful censurate. The satire of the middle comedy has been revived in our own times: yet we do not hear that Samuel Foote could claim the credit of reducing the number of Mother Coles; but we doubt not, that, in blackening the character of Whitfield, and sneering at the unfortunate Dr. Dodd, he stimulated the spirit of bigotry and persecution which raged against the former of these amongst vulgar minds, and confirmed multitudes in their derision of religious truth, their habits of vice, and their heedlessness of eternity. We must farther observe, that few vices can be imputed to an individual which would not subject him to punishment or injury; and that no orderly government can admit the publication of charges without proof, or tolerate the continual breaches of the peace which must result from employing the press as a vehicle of personal accusation and scurrility. Some crimes, however, escape the vengeance of public justice, by favour of an imperfect and partial system of law. Yet even here it is needless for the satirist to interfere, with any other design at least than to recommend a revision of the jurisprudence. Few crimes will come to his knowledge which are not sufficiently public without his intervention; and the seducer, the adulterer, the miser, the duellist who apprehends no censure from his immediate connections, or if he did would despise it, must be ridiculously weak, should he concern himself for the good opinion of the satirist, the nation, or posterity. If any efficacy could be ascribed to satire when directed against crimes, we might anticipate its success when directed against national crimes; against crimes which the nation has power to suppress, and its members in general have no interest to maintain; against the hideous traffic in blood, for instance, which has yielded, at length, to far other influence than that of humane satirists, double-tongued adversaries, or national repentance. In fine, one or two questions may, perhaps, be equivalent to fifty arguments,—"What profligate has it ever reclaimed to virtue, and what crime has it ever banished from society?" If one instance could be produced, we must again enquire, before we acknowledge its efficacy as an instrument of reform, "Has it altered the character, or only changed the vice? Has it purged a constitutional taint, or only obliterated a particular symptom?" We have no doubt that the answer to these questions will considerably lower the pretensions of this boasted instrument of reformation.

SATI'RICAL. SATI'RIC. *a.* (*satiricus*, Latin.) 1. Belonging to satire; employed in writing of invective (*Roscommon*). 2. Censorious; severe in language (*Swift*).

SATI'RICALLY. *ad.* (from *satirical.*) With invective; with intention to censure or vilify (*Dryden*).

SA'TIRIST. *s.* (from *satire.*) One who writes satires (*Pope*).

To SATIRIZE. *v. a.* (*satirizer*, Fr. from *satire.*) To censure as in a satire (*Dryden*).

SATISFA'CTION. *s.* (*satisfactio*, Latin.) 1. The act of pleasing to the full (*South*). 2. The state of being pleased (*Locke*). 3. Release from suspense, uncertainty, or uneasiness; conviction (*Shakspeare*). 4. Gratification; that which pleases (*Dryden*). 5. Amends; atonement for a crime; recompence for an injury (*Milton*).

SATISFA'CTIVE. *a.* (*satisfactus*, Latin.) Giving satisfaction (*Brown*).

SATISFA'CTORILY. *a.* (from *satisfactory.*) So as to content (*Digby*).

SATISFA'CTORINESS. *s.* (from *satisfactory.*) Power of satisfying; power of giving content (*Boyle*).

SATISFA'CTORY. *a.* (*satisfactoire*, Fr.) 1. Giving satisfaction; giving content (*Locke*). 2. Atoning; making amends (*Sanderson*).

To SA'TISFY. *v. a.* (*satisfactio*, Lat.) 1. To content; to please to such a degree as that nothing more is desired (*Addison*). 2. To feed to the fill (*Job*). 3. To recompense; to pay to content (*Shakspeare*). 4. To appease by punishment (*Milton*). 5. To free from doubt, perplexity, or suspense (*Locke*). 6. To convince (*Atterbury*).

To SA'TISFY. *v. n.* 1. To give content. 2. To feed to the full. 3. To make payment (*Locke*).

SATARRAH, a town and fort of Hindustan, in the province of Visiapour, formerly the capital of the Mahratta state. It is situate near the source of the Kistnah, 50 miles S. of Poonah, and 77 W. of Visiapour. Lon. 74. 8 E. Lat. 17. 45 N.

SA'TURABLE. *a.* (from *saturate.*) Impregnable with any thing till it will receive no more (*Grew*).

SA'TURANT. *a.* (from *saturans*, Latin.) Impregnating to the fill.

To SA'TURATE. *v. a.* (*saturo*, Lat.) To impregnate till no more can be received or imbibed (*Cheyne*).

SATURATION, in chemistry and pharmacy, a term employed to express that state of a body which has a power of dissolving another to a certain extent only, in which it has effected that degree of solution. Thus, nitric acid, for instance, can only dissolve a certain quantity of lime, beyond which it does not act, having lost its former affinity: this degree of solution is termed the point of saturation, and the nitric acid is then said to be saturated with lime.

SATURDAY, the 7th or last day of the week, so called, as some have supposed, from the idol Seater, worshipped on this day by the

ancient Saxons, and thought to be the same as the Saturn of the Latins. In astronomy, every day of the week is denoted by some one of the planets, and this day is marked with the planet ♄ Saturn. Saturday answers to the Jewish sabbath.

SATUREIA. Savory. In botany, a genus of the class didynamia, order gymnospermia. Corol with nearly equal segments; stamens distant. Eleven species, natives of the warmer parts of Europe, the Levant, and America.

The following are cultivated.

1. S. montana. Winter savory. Peduncles axillary, cymed, somewhat leaning to one side, segments of the calyx pointed, mucronate; leaves linear-lanceolate, entire, mucronate Perennial, with a low shrubby stalk, about a foot high; flowers axillary, upon short petioles, pale flesh colour. South of France: flowers in July and August.

2. S. hortensis. Summer savory. Peduncles axillary, somewhat cymed; leaves lanceolate, very entire; stem cross-armed; an erect annual, about a foot high, with flowers like the last; a native of the south of France.

3. S. juliana. Linear-leaved savory. Whorls flat-topped, numerous, reaching half-way down the stalk; leaves linear-lanceolate; the corol small, white, and fragrant. A native of Italy: flowers from May to September.

4. S. thymbra. Whorled savory. Whorls roundish, bristly; leaves ovate-oblong, pointed, veinless, dotted, bristly; a bushy plant, the leaves possessing a strong aromatic scent when bruised. A native of Candia.

5. S. capitata. Ciliated savory. Flowers spiked; leaves carinate, dotted, ciliate. A hoary plant, with flowers in short, roundish spikes, small, and white: the whole plant highly aromatic. A native of the Levant: flowers from June to October.

The first species may be raised from seeds, or by slips, the others by slips or cuttings of the strongest shoots planted in pots plunged into a moderate hot-bed. The two first are useful pot-herbs; the others afford variety among collections of greenhouse plants.

SATURITY. *s.* (*saturitas*, from *saturo*, Lat.) Fulness; the state of being saturated; repletion.

SATURN, one of the principal of the Pagan deities, was the son of Cœlus and Terra, and the father of Jupiter. He deposed and castrated his father; and obliged his brother Titan to resign his crown to him, on condition of his bringing up none of his male issue, that the succession might at length devolve on him. For this purpose, he devoured all the sons he had by his wife Rea or Cybele; but she bringing forth at one time Jupiter and Juno, she presented the latter to her husband, and sent the boy to be nursed on mount Ida; when Saturn being informed of her having a son, demanded the child; but in his stead his wife gave him a stone swaddled up like an infant, which he instantly swallowed. Titan finding that Saturn had violated the contract he had made with him, put himself at the head of his children, and made war on his brother, and, having made him and Cybele prisoners, confined them in Tartarus: but Jupiter being in the mean time grown up, raised an army in Crete, went to his father's assistance, defeated Titan, and restored Saturn to the throne. Some time after, Saturn, being told that Jupiter intended to dethrone him, endeavoured to prevent it, but the latter being informed of his intention, deposed his father, and threw him into Tartarus. But Saturn escaping from thence, fled into Italy, where he was kindly received by Janus king of the country, who associated him to the government: whence Italy obtained the name of Saturnia Tellus; as also that of Latium from *lateo*, to lie hid. There Saturn, by the wisdom and mildness of his government, is said to have produced the golden age.

Saturn is represented as an old man with four wings, armed with a scythe; sometimes he is delineated under the figure of a serpent with its tail in its mouth. This is emblematic of the seasons, which roll perpetually in the same circle. Sometimes also Saturn is painted with a sand glass in his hand. The Greeks say, that the story of his mutilating his father and destroying his children is an allegory, which signifies, that Time devours the past and present, and will also devour the future. The Romans in honour of him built a temple, and celebrated a festival, which they called Saturnalia. During this festival no business or profession was allowed to be carried on except cookery; all distinctions of rank ceased; slaves could say what they pleased to their masters with impunity; they could even rally them with their faults before their faces.

SATURN, one of the primary planets, being the sixth in order of distance from the sun, and the outermost of all, except the Georgian planet, Herschel, or Uranus; and is marked with the character ♄, denoting an old man supporting himself with a staff, representing the ancient god Saturn.

Saturn shines with but a feeble light, partly on account of his great distance, and partly from its dull red colour. This planet is perhaps one of the most engaging objects that astronomy offers to our view; it is surrounded with a double ring, one without the other, and beyond these by seven satellites, all in the plane of the rings; the rings and planets being all dark and dense bodies, like Saturn himself, these bodies casting their shadows mutually one upon another; though the reflected light of the rings is usually brighter than that of the planet itself.

Saturn has also certain obscure zones, or belts, appearing at times across his disc, like those of Jupiter, which are changeable, and are probably obscurations in his atmosphere. Dr. Herschel, Philos. Trans. 1790, shews that Saturn has a dense atmosphere; that he revolves about an axis, which is perpendicular to the plane of the rings; that his figure is, like the other planets, the oblate spheroid, being flatted

at the poles. See ASTRONOMY, PLANET, RING, and SATELLITE.

SATURN, in chemistry, an appellation given to lead.

SATURNALIA, in Roman antiquity, a festival observed about the middle of December, in honour of the god Saturn, whom Lucan introduces giving an account of the ceremonies observed on this occasion, thus. "During my whole reign, which lasts but for one week, no public business is done; there is nothing but drinking, singing, playing, creating imaginary kings, placing servants with their masters at table, &c. There shall be no disputes, reproaches, &c. but the rich and poor, masters and slaves, shall be equal," &c. On this festival the Romans sacrificed bare-headed, contrary to their custom at other sacrifices.

SATURNINE. *a.* (*saturninus*, Lat.) Not light; not volatile; gloomy; grave; melancholy; severe of temper (*Addison*).

SATURNIAN. *a.* (*saturninus*, Latin.) Happy; golden (*Pope*).

SATYAVARTA, or MENUE, in Indian mythology, is believed by the Hindus to have reigned over the whole world in the earliest age of their chronology, and to have resided in the country of Dravira on the coast of the eastern Indian peninsula. His patronymic name was *Vaivaswata*, or child of the sun. In the Bhagavat we are informed, that the Lord of the universe, intending to preserve him from the sea of destruction, caused by the depravity of the age, thus told him how he was to act. "In seven days from the present time, O thou tamer of enemies, the three worlds will be plunged in an ocean of death; but, in the midst of the destroying waves, a large vessel sent by me for thy use, shall stand before thee. Then shalt thou take all medicinal herbs, all the variety of seeds; and accompanied by seven saints, encircled by pairs of all brute animals, thou shalt enter the spacious ark, and continue in it, secure from the flood, on one immense ocean, without light, except the radiance of thy holy companions. When the ship shall be agitated by an impetuous wind, thou shalt fasten it with a large sea serpent on my horn; for I will be near thee, drawing the vessel, with thee and thy attendants, I will remain on the ocean, O chief of men, until a night of Brahma shall be completely ended. Thou shalt then know my true greatness, rightly named the supreme Godhead; by my favour, all thy questions shall be answered, and thy mind abundantly instructed." All this is said to have been accomplished; and the story is evidently that of Noah, disguised by Asiatic fiction and allegory. It proves, as sir William Jones has rightly observed, an ancient Indian tradition of the universal deluge described by Moses; and enables us to trace the connection between the eastern and western traditions relating to that event. The same learned author has shown it to be in the highest degree probable, that the Satyavrata of India is the Cronus of Greece, and the Saturn of Italy.

SATYRI, SATYRS, in antiquity, demigods of the country, whose origin is unknown. They are represented like men, but with the feet and the legs of goats, short horns on the head, and the whole body covered with thick hair. They chiefly attended upon Bacchus, and rendered themselves known in his orgies by their lasciviousness. The first fruits of every thing were generally offered to them. The Romans promiscuously called them Fauni, Panes, and Sylvani.

SATYRIASIS. (*satyriasis*, σατυριασις; from σατυρος, a satyr, because they are said to be greatly addicted to venery.) Satyriasmus. Priapismus. Salacitas. Excessive and violent desire for coition in men. A genus of disease in the class locales and order dysorexiæ of Cullen.

SATYRION. (*satyrion*, σατυριον; from σατυρος, an animal given to venery, so called because it was supposed to excite venery if only held in the hand.) Dog-stones. Male orchis. The root of the orchis mascula bulbis indivisis, nectarii labio quadrilobo crenulata, corno obtuso petalis dorsalibus reflexis of Linnéus. C. O. gynandria, diandria, which has a place in the materia medica of the Edinburgh pharmacopœia, on account of the glutinous slimy juice which it contains. The root of the ochis bifolia is also collected. Satyrion root has a sweetish taste, a faint and somewhat unpleasant smell. Its mucilaginous or gelatinous quality has recommended it as a demulcent. Salep, which is imported here from the East, is a preparation of this root, which, considered as an article of diet, is accounted extremely nutritious, as containing a great quantity of farinaceous matter in a small bulk. See SALEP.

SATYRIUM. Satyrion, or lizard-flower. In botany, a genus of the class gynandria, order diandria. Nectary consisting of a roundish, inflated bag behind the flower. Twenty-one species, natives, for the most part, of the Cape, a few of the West Indies, five or six of the south of Europe; four indigenous to our own woods. The following are cultivated.

1. S. hyrcinum. Lizard-satyrion; lizard-flower. Bulbs undivided; leaves lanceolate; lip of the nectary three-cleft; the middle segment very long, linear, twisted. Found in our pastures, rising three feet; and producing from twenty to sixty flowers of a fetid, goat-like smell; the upper part of the lip downy, with elegant purple spots on a white ground: the spike of flowers six inches long, the corol dirty-white, with linear stripes and brown spots: often called goat-orchis.

2. S. viride. Frog-satyrion. Bulbs palmate; leaves ovate, rather obtuse; lip of the nectary linear, three-cleft; the middle segment very small. The stem rises from five to eleven inches. Found also in our pastures.

3. S. albidum. White satyrion. Bulbs fascicled; leaves lanceolate; lip of the nectary three-cleft, acute; the middle segment longest. Stem from nine to fifteen inches high. Found in our meadows.

SAVA, a town of Persia, in Irak, surrounded by walls of earth. The environs produce

exquisite fruit, particularly pomegranates and almonds, and such a quantity of rice and cotton, that the inhabitants have a considerable trade in these articles. It is 60 miles S. of Casbin, and 110 E. of Amadan. Lon. 52. 15 E. Lat. 34. 30 N.

SA'VAGE. *a.* (*sauvage*, Fr. *selvaggio*, Ital.) 1. Wild; uncultivated (*Dryden*). 2. Untamed; cruel (*Pope*). 3. Uncivilized; barbarous; untaught; wild; brutal (*Sprat*).

SAVAGE (Richard), an English poet, natural son of Anne, countess of Macclesfield, by the earl of Rivers, was born 1698. Doomed to misery, his infancy was entrusted to a poor woman, by his unnatural mother, who wished not, indeed, to conceal her shame, but punish her offspring. His father was prevented from leaving him a legacy of 6000l. because the countess declared that he was dead, and then she endeavoured to send him to the plantations, and next placed him apprentice to a shoe-maker in Holborn. The death of the nurse altered his situation, and in searching the effects of a woman, whom he considered as his mother, Savage discovered letters which informed him of his birth. Leaving in disdain his humble profession, he addressed himself to his mother: but appeals were in vain upon her obdurate heart; and therefore, as he had acquired some learning at St. Alban's school, he commenced author. Though noticed by the wits of the age, Savage often passed his nights in the open fields, or in the streets, unable to pay even for an obscure lodging. His tragedy of Sir Thomas Overbury at last raised him to the short independence which could be gained from the profits of 200l.; but whilst he congratulated himself on his success, he in a drunken quarrel at a house of ill fame killed one of his companions, a Mr. Sinclair. He was tried and found guilty, and his mother not only rejoiced at his condemnation, but used her influence to cause him to be executed, and her wishes would have been gratified, had not the countess of Hertford reported to the queen the extraordinary sufferings of the culprit, and procured his pardon. Incapable of raising compassion in the breast of his mother, he thought he might extort money by the powers of ridicule. Lord Tyrconnel received him into his family and friendship, and allowed him 200l. a year. But the manners of Savage were licentious; fickle in his temper, violent and irascible, he easily quarrelled with his patron, and was dismissed. His next effort was the publication of his Bastard, a poem of great beauty, and which grew so popular, that his mother, then at Bath, fled from the place, to avoid hearing the lines, repeated on all sides, to create in her shame and confusion. His Volunteer Laureat, on the queen's birth-day, procured him from the royal purse a present of 50l. with a promise of the like annual sum; but the money was soon squandered, and the poet, without resources, quitted the house of a friend, where his politeness procured him an invitation, to pass the night in the society of the meanest rabble, in the summer on heaps of rubbish, and in the winter among the ashes of a glass-house. The death of the queen, in 1738, brought on, with the loss of his pension, increasing poverty; yet his friends promised to raise 50l. a year for him, if he would retire to Wales, and live there in privacy. He accepted the offer, and departed for his distant residence, but soon sighed for the dissipation of London. On his return he passed through Bristol, where his manners and conversation procured him admittance to the tables of the rich; but soon his company grew disagreeable from his late hours. Poverty increased his miseries; his clothes were too shabby for company, and he was arrested by the mistress of his coffee-house, for the small sum of 8l. Six months he languished in a jail, when a fever terminated his existence. He died 1743, aged 46, and was buried at the expense of the gaoler.

Thus lived, and thus died, Richard Savage, leaving behind him a character strangely chequered with vices and good qualities. Of the former, instances appear even in this abstract of his life; of the latter, his peculiar situation in the world gave him but few opportunities of making any considerable display. He was, however, undoubtedly a man of excellent parts; and had he received the full benefits of a liberal education, and had his natural talents been cultivated to the best advantage, he might have made a respectable figure in life. He was happy in quick discernment, a retentive memory, and a lively flow of wit, which made his company much coveted; nor was his judgment both of writings and of men inferior to his wit: but he was too much a slave to his passions, and his passions were too easily excited. He was warm in his friendships, but implacable in his enmity; and his greatest fault, which is indeed the greatest of all faults, was ingratitude. He seemed to think every thing due to his merit, and that he was little obliged to any one for those favours which he thought it their duty to confer on him: it is therefore the less to be wondered at, that he never rightly estimated the kindness of his many friends and benefactors, or preserved a grateful and due sense of their generosity towards him.

The works of this original writer, after having long lain dispersed in magazines and fugitive publications, have been collected, and published in an elegant edition, in 2 vols. 8vo; to which are prefixed, the admirable Memoirs of Savage written by Dr. Johnson.

SAVAGE is a word so well understood as scarcely to require explanation. When applied to inferior animals, it denotes that they are wild, untamed, and cruel; when applied to man, it is of much the same import with barbarian, and means a person who is untaught and uncivilized, or who is in the rude state of uncultivated nature. That such men exist at present, and have existed in most ages of the world, is undeniable; but a question naturally occurs respecting the origin of this savage state, the determination of which is of considerable im-

portance in developing the nature of man, and ascertaining the qualities and powers of the human mind. Upon this subject, as upon most others, opinions are very various, and the systems built upon them are consequently very contradictory. A large sect of ancient philosophers maintained that man sprung at first from the earth like his brother vegetables; that he was without ideas, and without speech; and that many ages elapsed before the race acquired the use of language, or attained to greater knowledge than the beasts of the forest. Other sects again, with the vulgar, and almost all the poets, maintained that the first mortals were wiser and happier, and more powerful, than any of their offspring: that mankind, instead of being originally savages, and rising to the state of civilization by their own gradual and progressive exertions, were created in a high degree of perfection; that, however, they degenerated from that state, and that all nature degenerated with them. Hence the various ages of the world have almost every where been compared to gold, silver, brass, and iron, the golden having been always supposed to be the first age.

Since the revival of letters in Europe, and especially during the present century, the same question has been much agitated both in France and England, and by far the greater part of the most fashionable names in modern science have declared for the original savagism of men. Such of the ancients as held that opinion were countenanced by the atheistic cosmogony of the Phœnicians, and by the early history of their own nations; the moderns build their system upon what they suppose to be the constitution of the human mind, and upon late improvements in arts and sciences.

In the preliminary discourse to Sketches of the History of Man, lord Kaimes would infer, from some facts which he states, that many pairs of the human race were at first created, of very different forms and natures, but all depending entirely on their own natural talents. But to this statement he rightly observes, that the Mosaic account of the creation opposes insuperable objections. "Whence then (says his lordship) the degeneracy of all men into the savage state? To account for that dismal catastrophe, mankind must have suffered some dreadful convulsion." Now, if we mistake not, this is taking for granted the very thing to be proved. We deny that, at any period since the creation of the world, all men were sunk into the state of savages; and that they were, no proof has yet been brought, nor do we know of any that can be brought, unless our fashionable philosophers choose to prop their theories by the buttress of Sanchoniatho's Phœnician cosmogony. His lordship, however, goes on to say, or rather to suppose, that the confusion at Babel, &c. was this dreadful convulsion: "For, (says he) by confounding the language of men, and scattering them abroad upon the face of all the earth, they were rendered savages." Here again we have a positive assertion, without the least shadow of proof, for it does not at all appear that the confusion of language, and the scattering abroad of the people, was a circumstance such as could induce universal savagism. There is no reason to think that all the men then alive were engaged in building the tower of Babel; nor does it appear from the Hebrew original, that the language of those who were engaged in it was so much changed as the reader is apt to infer from our English version. That the builders were scattered, is indeed certain; and if any of them were driven, in very small tribes, to a great distance from their brethren, they would in process of time inevitably become savages. But it is evident, from the Scripture account of the peopling of the earth, that the descendants of Shem and Japheth were not scattered over the face of all the earth, and that therefore they could not be rendered savage by the catastrophe at Babel. In the chapter which relates that wonderful event, the generations of Shem are given in order down to Abram; but there is no indication that they had suffered with the builders of the tower, or that any of them had degenerated into the state of savages. On the contrary, they appear to have possessed a considerable degree of knowledge; and if any credit is due to the tradition which represents the father of Abraham as a statuary, and himself as skilled in the science of astronomy, they must have been far advanced in the arts of refinement. Even such of the posterity of Ham as either emigrated, or were driven from the plain of Shinar in large bodies, so far from sinking into savagism, retained the accomplishments of their antediluvian ancestors, and all became afterwards the instructors of the Greeks and Romans. This is evident from the history of the Egyptians and other eastern nations, who in the days of Abraham were powerful, and highly civilized. And that for many ages they did not degenerate into barbarism is apparent from its having been thought to exalt the character of Moses, that he was learned in all the wisdom of the Egyptians, and from the wisdom of Solomon having been said to excel all the wisdom of the east country and of Egypt.

Thus decided are the Scriptures of the Old Testament against the universal prevalence of savagism in that period of the world; nor are the most authentic Pagan writers of antiquity of a different opinion. Mochus the Phœnician, Democritus, and Epicurus, appear to be the first champions of the savage state, and they are followed by a numerous body of poets and rhapsodists, among the Greeks and Romans, who were unquestionably devoted to fable and fiction. The account which they have given of the origin of man must be well known to the classical reader. But we hardly think that he will employ it in support of the fashionable doctrine of original savagism. Against the wild reveries of this school are posted all the leaders of the other sects, Greeks and barbarians; the philosophers of both academies, the sages of the Italian and Alexandrian schools; the magi of Persia, the bramins of India, and the druids of Gaul, &c. The testimony of the early historians among all the ancient nations, indeed, who are avowedly fabulists, is very little to be de-

pended on, and has been called in question by the most judicious writers of pagan antiquity. (See Plutarchi Vita Thes. sub. init. Thucyd. l. i. cap. 1. Strabo, l. ii. p. 507. Liv. Pref. and Varro ap. August. de Civ. Dei.) The more populous and extensive kingdoms and societies were civilized at a period prior to the records of profane history: the presumption, therefore, without taking revelation into the account, certainly is, that they were civilized from the beginning. This is rendered further probable from other circumstances. To account for their system, the advocates of savagism are obliged, as we have seen, to have recourse to numerous suppositions. They imagine, that since the creation dreadful convulsions have happened, which have spread ruin and devastation over the earth, which have destroyed learning and the arts, and brought on savagism by one sudden blow. But this is reasoning at random, and without a vestige of probability; for the only convulsion that can be mentioned is that of Babel, which we have already shown to be inadequate.

Further, it does not appear that any people who were once civilized, and in process of time had degenerated into the savage or barbarous state, have ever recovered their pristine condition without foreign aid. From whence we conclude, that man, once a savage, would never have raised himself from that hopeless state. This appears evident from the history of the world; for that it requires strong incitements to keep man in a very high state of knowledge and civilization, is evident from what we know of the numerous nations which were famed in antiquity, but which are now degenerated in an astonishing degree. That man cannot, or, which is the same thing, has not risen from barbarism to civilization and science by his own efforts and natural talents, appears further from the following facts. The rudiments of all the learning, religion, laws, arts, and sciences, and other improvements that have enlightened Europe, a great part of Asia, and the northern coast of Africa, were so many rays diverging from two points, on the banks of the Euphrates and the Nile. In proportion as nations receded from these two sources of humanity and civilization, in the same proportion were they more and more immersed in ignorance and barbarism. The Greeks had made no progress towards civilization when the Titans first, and afterwards colonies from Egypt and Phœnicia, taught them the very elements of science and urbanity. The aborigines of Italy were in the same state prior to the arrival of the Pelasgi, and the colonies from Arcadia and other parts of Greece. Spain was indebted for the first seeds of improvement to the commercial spirit of the Phœnicians. The Gauls, the Britons, and the Germans, derived from the Romans all that in the early periods of their history they knew of science, or the arts of civil life, and so on of other nations in antiquity. The same appears to be the case in modern times. The countries which have been discovered by the restless and inquisitive spirit of Europeans have been generally found in the lowest state of savagism; from which if they have emerged at all, it has been exactly in proportion to their connexion with the inhabitants of Europe. Even western Europe itself, when sunk in ignorance, during the reign of monkery, did not recover by the efforts of its own inhabitants. Had not the Greeks, who in the 15th century took refuge in Italy from the cruelty of the Turks, brought with them their ancient books, and taught the Italians to read them, we who are disputing about the origin of the savage state, and the innate powers of the human mind, had at this day been gross and ignorant savages ourselves, incapable of reasoning with accuracy upon any subject. That we have now advanced far before our masters is readily admitted; for the human mind, when put on the right track, and spurred on by emulation and other incitements, is capable of making great improvements; but between improving science, and emerging from savagism, every one perceives there is an immense difference.

Lord Kaimes observes, that the people who inhabit a grateful soil, where the necessaries of life are easily procured, are the first who invent useful and ingenious arts, and the first who figure in the exercises of the mind. But the Egyptians and Chaldeans, who are thought to support this remark, appear from what we have seen to have derived their knowledge from their antediluvian progenitors, and not from any advantages of situation or strength of genius. Besides, the inhabitants of a great part of Africa, and North and South America, and of many of the islands lately discovered, live in regions equally fertile, and equally productive of the necessaries of life, with the regions of Chaldea and Egypt; yet these people have been savages from time immemorial, and continue still in the same state. The Athenians, on the other hand, inhabited the most barren and ungrateful region of Greece, while their perfection in the arts and sciences has never been equalled. The Norwegian colony which settled in Iceland about the beginning of the 8th century inhabited a most bleak and barren soil, and yet the fine arts were eagerly cultivated in that dreary region when the rest of Europe was sunk in ignorance and barbarism. Again, there are many parts of Africa, and of North and South America, where the soil is neither so luxuriant as to beget indolence, nor so barren and ungrateful as to depress the spirits by labour and poverty; where, notwithstanding, the inhabitants still continue in an uncultivated state. From all which, and from numerous other instances which our limits permit us not to bring forward, we infer that some external influence is necessary to impel towards civilization savages; and that in the history of the world, or the nature of the thing, we find no instance of any people emerging from barbarism by the progressive efforts of their own genius. On the contrary, as we find in societies highly cultivated and luxurious a strong tendency to degenerate, so in savages we not only find no

mark of tendency to improvement, but rather a rooted aversion to it. Among them, indeed, the social appetite never reaches beyond their own horde. It is, therefore, too weak and too confined to dispose them to unite in large communities; and of course, had all mankind been once in the savage state, they never could have arrived at any considerable degree of civilization.

Instead of trusting to any such natural progress, as is contended for, the Providence of Heaven, in pity to the human race, appears at different times, and in different countries, to have raised up some persons endowed with superior talents, or, in the language of poetry, some heroes, demi-gods, or god-like men, who having themselves acquired some knowledge in nations already civilized, by useful inventions, legislation, religious institutions, and moral arrangements, sowed the first seeds of civilization among the hordes of wandering disunited barbarians. Thus we find the Chinese look up to their Fohee, the Indians to Brahma, the Persians to Zoroaster, the Chaldeans to Oanes, the Egyptians to Thoth, the Phœnicians to Melicerta, the Scandinavians to Odin, the Italians to Janus, Saturn, and Picus, and the Peruvians to Manco. In later times, and almost within our own view, we find the barbarous nations of Russia reduced to some order and civilization by the astonishing powers and exertions of Peter the Great. The endeavours of succeeding monarchs, and especially of the late empress, have powerfully contributed to the improvement of this mighty empire. In many parts of it, however, we still find the inhabitants in a state very little superior to savagism; and through the most of it, the lower, and perhaps the middling orders, appear to retain an almost invincible aversion to all further progress. A fact, which, when added to numerous others of a similar nature which occur in the history of the world, seems to prove indisputably that there is no such natural propensity to improvement in the human mind as we are taught by some authors to believe. The origin of savagism, if we allow mankind to have been at first civilized, is easily accounted for by natural means: the origin of civilization, if at any period the whole race were savages, cannot, we think, be accounted for otherwise than by a miracle, or repeated miracles.

To many persons, in the present day especially, the doctrine we have now attempted to establish will appear very humiliating; and perhaps it is this alone that has prevented many from giving the subject so patient a hearing as its importance seems to require. It is a fashionable kind of philosophy to attribute to the human mind very pre-eminent powers; which so flatter our pride, as in a great measure, perhaps, to pervert our reason, and blind our judgment. The history of the world, and of the dispensations of God to man, are certainly at variance with the popular doctrine respecting the origin of civilization: for, if the human mind be possessed of that innate vigour which that doctrine attributes to it, it will be extremely difficult to account for those numerous facts which seem with irresistible evidence to proclaim the contrary; for that unceasing care with which the Deity appears to have watched over us; and for those various and important revelations He has vouchsafed to us. Let us rejoice and be thankful that we are men, and that we are Christians; but let not a vain philosophy tempt us to imagine that we are angels or gods. See HOMO and MAN.

SAVAGE ISLAND, an island in the S. Pacific Ocean, about 35 miles in circumference, discovered by captain Cook in 1774. It received this name from the rude and inhospitable behaviour of the inhabitants, who were stout, well made men, naked, except round the waists: some of them had their faces, breast, and thighs painted black. Lon. 169. 37 W. Lat. 19. 1 S.

SA'VAGE. *s.* (from the adjective.) A man untaught and uncivilized; a barbarian (*Ral.*).

To SA'VAGE. *v. a.* (from the noun.) To make barbarous, wild, or cruel (*Thomson*).

SA'VAGELY. *ad.* (from *savage.*) Barbarously; cruelly (*Shakspeare*).

SA'VAGENESS. *s.* (from *savage.*) Barbarousness; cruelty; wildness (*Broome*).

SA'VAGERY. *s.* (from *savage.*) 1. Cruelty; barbarity (*Shakspeare*). 2. Wild growth.

SAVA'NNA. *s.* An open meadow without wood (*Locke*).

SAVANNAH, a river of N. America, which forms a part of the divisional line that separates the state of Georgia from that of S. Carolina. It is navigable for boats of 100 feet keel from Augusta to Savannah, and thence for large vessels to its entrance into the Atlantic Ocean, at Tybee Bar. Lat. 31. 57 N.

SAVANNAH, a town of the United States, in Georgia, of which it was formerly the capital. It is regularly built in the form of a parallelogram, and seated on a high sandy bluff, on the south side of a river of the same name, 17 miles from its mouth, and 117 S.E. of Augusta. Lon. 80. 20 W. Lat. 32. 0 N.

SAVARY (James), of Doué, in Anjou, was employed in commercial pursuits, and afterwards admitted of the council for the reformation of commerce. As his knowledge was very extensive, he digested his ideas into a volume, published 1675, 4to, under the title of The Parfait Negociant, a useful work, translated into every language of Europe. He published a supplementary volume in 1688, and died 1690. He had 17 children by one wife, and 11 survived him. Two of these, sons, James and Philemon, completed that useful work The Universal Dictionary of Commerce, published, 2 vols. folio, 1723, and again in 3 vols. folio, 1748. James died 1716, and Philemon, 1727.

SAVARY (N.), of Vitre, in Britanny, travelled, in 1776, into Egypt, where he continued three years. On his return he visited the Archipelago, and in 1780 published a translation of the Koran, and afterwards produced his Letters on Egypt, 2 vols. 8vo. a po-

pular work, translated into various languages. He published also Letters on Greece. He died 1788, at Paris.

SAUCE. *s.* (*saulse*, French; *salsa*, Italian.) 1. Something eaten with food to improve its taste (*Baker*). 2. *To serve one the same* SAUCE. A vulgar phrase to retaliate one injury with another.

To SAUCE. *v. a.* (from the noun.) 1. To accompany meat with something of higher relish. 2. To gratify with rich tastes (*Shakspeare*). 3. To intermix or accompany with any thing good, or, ironically, with any thing bad (*Shakspeare*).

SAUCE ALONE. See ALLIARIA.

SA'UCEBOX. *s.* (from *sauce*, or rather from *saucy*.) An impertinent or petulant fellow (*Addison*).

SA'UCEPAN. *s.* (*sauce* and *pan*.) A small skillet with a long handle, in which sauce or small things are boiled (*Swift*).

SA'UCER. *s.* (*sauciere*, French, from *sauce*.) 1. A small pan or platter on which sauce is set on the table (*Hudibras*). 2. A piece or platter of china, into which a tea-cup is set.

SA'UCILY. *ad.* (from *saucy*.) Impudently; impertinently; petulantly; in a saucy manner.

SA'UCINESS. *s.* (from *saucy*.) Impudence; petulance; impertinence; contempt of superiours (*Collier*).

SAUCISSE, or SAUCISSON, in mining, is a long pipe or bag made of cloth well pitched, or sometimes of leather, of about an inch and a half diameter, filled with powder, going from the chamber of the mine to the entrance of the gallery. It is generally placed in a wooden pipe called an auget, to prevent its growing damp. It serves to give fire to mines, cassions, bomb-chests, &c.

SAUCISSON, is likewise a kind of fascine, longer than the common ones; they serve to raise batteries and to repair breaches. They are also used in making epaulements, in stopping passages, and in making traverses over a wet ditch, &c.

SA'UCY. *a.* (*salsus*, Latin.) Pert; petulant; contemptuous of superiours; insolent; impudent; impertinent (*Addison*).

SAVE, a river of Germany, which has its source in Carniola, runs through that country from W. to E. separates Sclavonia from Croatia, Bosnia, and Servia, and falls into the Danube, at Belgrade.

To SAVE. *v. a.* (*sauver*, *salver*, French; *salvo*, Latin.) 1. To preserve from danger or destruction (*Dryden*). 2. To preserve finally from eternal death (*Rogers*). 3. Not to spend; to hinder from being spent or lost (*Dryden*). 4. To preserve or lay by (*Job*). 5. To spare; to excuse (*Dryden*). 6. To salve; to reconcile (*Milton*). 7. To take or embrace opportunely, so as not to lose (*Swift*).

To SAVE. *v. n.* To be cheap (*Bacon*).

SAVE. *ad.* (This word, adverbially used, is, like *except*, originally the imperative of the verb.) Except; not including (*Bacon*).

SA'VEALL. (*save* and *all*.) A small pan inserted into a candlestick to save the ends of candles.

SAVENAY, a town of France, in the department of Lower Loire, 18 miles N.W. of Nantes, and 32 W. of Ancenis. Lon. 1. 55 W. Lat. 47. 23 N.

SAVENDROOG, a strong fortress of Hindustan, in the kingdom of Mysore. It is situate on the top of a vast rock, rising half a mile in perpendicular height, from a base of above eight miles in circumference, and divided at the summit by a chasm, that forms it into two hills; these having each its peculiar defences, serve as two citadels, capable of being maintained, independently of the lower works, which are also wonderfully strong. Notwithstanding this, it was taken by the English, in 1791, after a siege of seven days. It is 18 miles W. of Bangalore.

SA'VER. *s.* (from *save*.) 1. Preserver; rescuer (*Sidney*). 2. One who escapes loss, though without gain (*Swift*). 3. A good husband. 4. One who lays up and grows rich.

SAVER KROUT. See CROUT.

SAVERDUN, a town of France, in the department of Arriege, seated on the Arriege, 25 miles S.S.E. of Toulouse. Lon. 1. 36 E. Lat. 43. 14 N.

SAVERNE, a town of France, in the department of Lower Rhine, with a palace, the occasional residence of the late archbishops of Strasburgh. It is seated at the foot of Mont Vosges, in a fertile country, which produces plenty of wine, 18 miles N.W. of Strasburgh, and 120 E. of Paris. Lon. 7. 33 E. Lat. 48. 41 N.

SAVIGLIANO, a strong town of Piedmont, capital of a territory of the same name, with a rich Benedictine abbey. It is seated on the Maira, five miles W. of Fossano, and 26 S. of Turin. Lon. 7. 44 E. Lat. 44. 30 N.

SAVILLE (Sir Henry), in biography, a very learned Englishman, the second son of Henry Saville, esq. was born at Bradley, near Halifax, in Yorkshire, November the 30th, 1549. He was entered of Merton College, Oxford, in 1561, where he took the degrees in arts, and was chosen fellow. When he proceeded master of arts, in 1570, he read, for that degree, on the Almagest of Ptolemy, which procured him the reputation of a man eminently skilled in mathematics, and the Greek language; in the former of which he voluntarily read a public lecture in the university for some time.

In 1578, he travelled into France, and other countries; where, diligently improving himself in all useful learning, in languages, and the knowledge of the world, he became a most accomplished gentleman. At his return, he was made tutor in the Greek tongue to queen Elizabeth, who had a great esteem and respect for him.

In 1585, he was made warden of Merton College, which he governed six and thirty years with great honour, and improved it by all

the means in his power. In 1596, he was chosen provost of Eton College, which he filled with many learned men. James I. upon his accession to the crown of England, expressed a great regard for him, and would have preferred him either in church or state; but Saville declined it, and only accepted the ceremony of knighthood from the king, at Windsor, in 1604. His only son, Henry, dying about that time, he henceforth devoted his fortune to the promoting of learning. Among other things, in 1619, he founded, in the university of Oxford, two lectures, or professorships, one in geometry, the other in astronomy; which he endowed with a salary of 160*l.* a year each, besides a legacy of 600*l.* to purchase more lands for the same use. He also furnished a library with mathematical books, near the mathematical school, for the use of his professors; and gave 100*l.* to the mathematical chest of his own appointing; adding afterwards a legacy of 40*l.* a year to the same chest, to the university, and to his professors jointly. He likewise gave 120*l.* towards the new building of the schools, beside several rare manuscripts and printed books to the Bodleian library; and a good quantity of Greek types to the printing press at Oxford.

After a life thus spent in the encouragement and promotion of science and literature in general, he died at Eton College, the 19th of February, 1622, in the seventy-third year of his age, and was buried in the chapel there. On this occasion the university of Oxford paid him the greatest honours, by having a public speech and verses made in his praise, which were published soon after in 4to. under the title of Ultima Linea Savillii.

As to the character of Saville, the highest encomiums are bestowed upon him by all the learned of his time; by Casaubon, Mercerus, Meibomius, Joseph Scaliger, and especially the learned bishop Montague, who, in his Diatribæ upon Selden's History of Tythes, styles him, "that magazine of learning, whose memory shall be honourable amongst not only the learned, but the righteous for ever."

Several noble instances of his munificence to the republic of letters have already been mentioned: in the account of his publications many more, and even greater, will appear. These are,

1. Four Books of the Histories of Cornelius Tacitus, and the Life of Agricola, with Notes upon them, in folio; dedicated to queen Elizabeth, 1581.

2. A View of certain Military Matters, or Commentaries respecting Roman Warfare. 1598.

3. Rerum Anglicarum Scriptores post Bedam, &c. 1596. This is a collection of the best writers of our English history; to which he added chronological tables at the end, from Julius Cæsar to William the Conqueror.

4. The Works of St. Chrysostom, in Greek, in eight volumes folio, 1613. This is a very fine edition, and composed with great cost and labour. In the preface he says, "that having himself visited, about twelve years before, all the public and private libraries in Britain, and copied out thence whatever he thought useful to this design, he then sent some learned men into France, Germany, Italy, and the East, to transcribe such parts as he had not already, and to collate the others with the best manuscripts." At the same time he makes his acknowledgments to several eminent men for their assistance; as Thuanus, Velserus, Schottus, Casaubon, Ducæus, Gruter, Hoeschelius, &c. In the eighth volume are inserted Sir Henry Saville's own notes, with those of other learned men. The whole charge of this edition, including the several sums paid to learned men, at home and abroad, employed in finding out, transcribing, and collating the best manuscripts, is said to have amounted to no less than 8000*l.* Several editions of this work were afterwards published at Paris.

5. In 1618 he published a Latin work, written by Thomas Bradwardin, archbishop of Canterbury, against Pelagius, entitled De Causa Dei contra Pelagium, et de virtute Causarum; to which he prefixed the Life of Bradwardin.

6. In 1621 he published a Collection of his own Mathematical Lectures on Euclid's Elements, in 4to.

7. Oratio coram Elizabetha Regina Oxoniæ habita, anno 1592. Printed at Oxford in 1658, 4to.

8. He translated into Latin king James's Apology for the Oath of Allegiance. He also left several manuscripts behind him, written by order of king James; all which are in the Bodleian library. He wrote notes likewise upon the margin of many books in his library, particularly Eusebius's Ecclesiastical History; which were afterwards used by Valesius, in his edition of that work, in 1659. Four of his Letters to Camden are published by Smith, among Camden's Letters. 1691. 4to.

Saville (George), marquis of Halifax, born in the county of York, about 1630, and distinguished for his assistance in the restoration. He was created a peer in consideration of his services to the crown; and in 1672 obtained a seat in the privy council, from which he was afterwards removed for opposing the measures of the court. He voted against the duke of York's exclusion bill; and upon the arrival of the prince of Orange, he was sent by the king, with the earls of Rochester and Godolphin, to treat with him. In the convention parliament he was chosen speaker of the house of lords, and strenuously supported the motion for the vacancy of the throne, and the conjunctive sovereignty of the prince and princess, upon whose accession he was made privy seal, as he had been under James. But in the session of 1689, upon the enquiry into the authors of the prosecutions against lord Russel, Algernon Sydney, &c. the marquis having concurred in these councils in 1683, now quitted the court, and became a zealous opposer of the measures of government till his death, which happened in 1695. He wrote Advice to a Daughter, Maxims of State, and

several other pieces, which were printed together in 1717, 8vo. There have been some other tracts printed since these, as the Character of Charles II., Historical Observations on the Reigns of the three first Edwards, &c.

SAVIN, in botany. See SABINA and JUNIPERUS.

SAVINA. See SABINA.

SA'VING. *a.* (from *save.*) 1. Frugal; parsimonious; not lavish (*Arb.*). 2. Not turning to loss, though not gainful (*Addison*).

SA'VING. *ad.* With exception in favour of.

SA'VING. *s.* (from *save.*) 1. Escape of expence; somewhat preserved from being spent (*Addison*). 2. Exception in favour (*L'Estr.*).

SA'VINGLY. *ad.* (from *saving.*) With parsimony.

SA'VINGNESS. *s.* (from *saving.*) 1. Parsimony; frugality. 2. Tendency to promote eternal salvation.

SA'VIOUR. *s.* (*sauveur*, Fr.) Redeemer; he that has graciously saved believers from eternal death (*Addison*).

SAVIOUR (Order of St.), a religious order of the Romish church, founded by St. Bridget about the year 1345, and so called from its being pretended that our Saviour himself declared its constitution and rules to the foundress. According to the constitutions, this is principally founded for religious women, who pay a particular honour to the holy Virgin; but there are some monks of the order, to administer the sacrament and spiritual assistance to the nuns.

SAUL, son of Kish, was anointed king of Israel, 1095 B. C. He disobeyed God by sparing the Amalekites, and Samuel told him that the kingdom would be removed from his family. He was jealous of the popularity of David, who had killed Goliath, and who was to succeed him. He killed himself after an unfortunate battle at Gilboah. See the first book of Samuel.

SAULIEU, a town of France, in the department of Cote d'Or. Here was anciently a college of the Druids, and a wood in which they performed their sacrifices, and where the ruins of a druidical temple are still visible. It is seated on an eminence, 25 miles W. of Dijon, and 142 S.E. of Paris. Lon. 4. 7 E. Lat. 47. 17 N.

SAUMUR, a town of France, in the department of Maine and Loire, with an ancient castle. Here is a famous bridge over the Loire, consisting of 12 elliptic arches, each 60 feet in diameter. It is 22 miles S.E. of Angers, and 160 S.W. of Paris. Lon. 0. 4 W. Lat. 47. 15 N.

SAUNDERS (Red). See SANTALUM RUBRUM.

SAUNDERS (Yellow). See SANTALUM CITRINUM.

SAUNDERSON (Dr. Robert), an eminent casuist, was born at Rotherham, in Yorkshire, on the 19th September, 1587, and was descended of an ancient family. He attended the grammar-school at Rotherham, where he made such wonderful proficiency in the languages, that at 13 it was judged proper to send him to Lincoln college, Oxford. In 1608 he was appointed logic-reader in the same college. He took orders in 1611, and was promoted successively to several benefices. Archbishop Laud recommended him to king Charles I. as a profound casuist; and that monarch, who seems to have been a great admirer of casuistical learning, appointed him one of his chaplains in 1631. In 1642 Charles created him regius professor of divinity at Oxford, with the canonry of Christ-church annexed: but the civil wars prevented him till 1646 from entering on the office; and in 1648 he was ejected by the visitors which the parliament had commissioned. He must have stood high in the public opinion; for, in the same year in which he was appointed professor of divinity, both houses of parliament recommended him to the king as one of their trustees for settling the affairs of the church. He was taken prisoner by the parliament's troops and conveyed to Lincoln, in order to procure in exchange a Puritan divine named Clark, whom the king's army had taken. The exchange was agreed to, on condition that Dr. Saunderson's living should be restored, and his person and property remain unmolested. The first of these demands was readily complied with: and a stipulation was made, that the second should be observed; but it was impossible to restrain the licentiousness of the soldiers. They entered his church in the time of divine service, interrupted him when reading prayers, and even had the audacity to take the common prayer book from him, and to tear it to pieces. When Charles II. was reinstated in the throne, Dr. Saunderson recovered his professorship and canonry, and soon after was promoted to the bishopric of Lincoln. During the two years and a half in which he possessed this new office, he spent a considerable sum in augmenting poor vicarages, in repairing the palace at Bugden, &c. He died January 29th, 1662-3, in his 76th year.

He was a man of great acuteness and solid judgment. "That staid and well-weighed man, Dr. Saunderson (says Dr. Hammond), conceives all things deliberately, dwells upon them discreetly, discerns things that differ exactly, passeth his judgment rationally, and expresses it aptly, clearly, and honestly." It will now be proper to give a short account of his works. 1. In 1615 he published Logicæ Artis Compendium, which was the system of lectures he had delivered in the University when he was logic reader. 2. Sermons, amounting in number to 36, printed in 1681, folio, with the author's life by Walton. 3. Nine Cases of Conscience resolved; first collected in one volume, in 1678, 8vo. 4. De juramenti obligatione. This book was translated into English by Charles I. while a prisoner in the Isle of Wight, and printed at London in 1665, 8vo. 5. De Obligatione conscientiæ. 6. Censure of Mr. Antony Ascham his book of the confusions and revolutions of government. 7. Pax Ecclesiæ concerning Predestination, or

the five points. 8. Episcopacy, as established by law in England, not prejudicial to the regal power, in 1661. Besides these, he wrote two Discourses in defence of Usher's writings.

SAUNDERSON (Dr. Nicholas), in biography, an illustrious professor of mathematics in the University of Cambridge, and a fellow of the Royal Society, was born at Thurlston, in Yorkshire, in 1682. When he was but twelve months old, he lost not only his eye-sight, but his very eye-balls, by the small pox; so that he could retain no more ideas of vision than if he had been born blind. At an early age, however, being of very promising parts, he was sent to the free school at Penniston, and there laid the foundation of that knowledge of the Greek and Latin languages, which he afterwards improved so far, by his own application to the classic authors, as to hear the works of Euclid, Archimedes, and Diophantus, read in their original Greek.

Having acquired a grammatical education, his father, who was in the excise, instructed him in the common rules of arithmetic. And here it was that his excellent mathematical genius first appeared; for he very soon became able to work the common questions, to make very long calculations by the strength of his memory, and to form new rules to himself for the better resolving of such questions as are often proposed to learners as trials of skill.

At the age of eighteen, our author was introduced to the acquaintance of Richard West, of Underbank, esq., a lover of mathematics, who, observing Mr. Saunderson's uncommon capacity, took the pains to instruct him in the principles of algebra and geometry, and gave him every encouragement in his power to the prosecution of these studies. Soon after this he became acquainted also with Dr. Nettleton, who took the same pains with him. And it was to these two gentlemen that Mr. Saunderson owed his first institution in the mathematical sciences; they furnished him with books, and often read and expounded them to him. But he soon surpassed his masters, and became fitter to teach, than to learn any thing from them.

His father, otherwise burthened with a numerous family, finding a difficulty in supporting him, his friends began to think of providing both for his education and maintenance. His own inclination led him strongly to Cambridge, and it was at length determined he should try his fortune there, not as a scholar, but as a master: or, if this design should not succeed, they promised themselves success in opening a school for him at London. Accordingly he went to Cambridge in 1707, being then twenty-five years of age, and his fame in a short time filled the University. Newton's Principia, Optics, and Universal Arithmetic, were the foundations of his lectures, and afforded him a noble field for the display of his genius; and great numbers came to hear a blind man give lectures on optics, discourse on the nature of light and colours, explain the theory of vision, the effect of glasses, the phenomenon of the rainbow, and other objects of sight.

As he instructed youth in the principles of the Newtonian philosophy, he soon became acquainted with its incomparable author, though he had several years before left the University; and frequently conversed with him on the most difficult parts of his works: he also held a friendly communication with the other eminent mathematicians of the age, as Halley, Cotes, De Moivre, &c.

Mr. Whiston was all this time in the mathematical professor's chair, and read lectures in the manner proposed by Mr. Saunderson on his settling at Cambridge, so that an attempt of this kind looked like an encroachment on the privilege of his office; but, as a good natured man, and an encourager of learning, he readily consented to the application of friends made in behalf of so uncommon a person.

Upon the removal of Mr. Whiston from his professorship, Mr. Saunderson's merit was thought so much superior to that of any other competitor, that an extraordinary step was taken in his favour, to qualify him with a degree, which the statute requires: in consequence he was chosen, in 1711, Mr. Whiston's successor in the Lucasian professorship of mathematics, Sir Isaac Newton interesting himself greatly in his favour. His first performance, after he was seated in the chair, was an inaugural speech made in very elegant Latin, and a style truly Ciceronian; for he was very well versed in the writings of Tully, who was his favourite in prose, as Virgil and Horace were in verse. From this time he applied himself closely to the reading of lectures, and gave up his whole time to his pupils. He continued to reside among the gentlemen of Christ College till the year 1723, when he took a house in Cambridge, and soon after married a daughter of Mr. Dickens, rector of Boxworth, in Cambridgeshire, by whom he had a son and a daughter.

In the year 1728, when king George visited the university, he expressed a desire of seeing so remarkable a person; and, accordingly, our professor attended the king in the senate, and by his favour was there created doctor of laws.

Dr. Saunderson was naturally of a strong healthy constitution; but being too sedentary, and constantly confining himself to the house, he became a valetudinarian: and in the spring of the year 1739 he complained of a numbness in his limbs, which ended in a mortification in his foot, of which he died the 19th of April that year, in the 57th year of his age.

There was scarcely any part of the mathematics on which Dr. Saunderson had not composed something for the use of his pupils. But he discovered no intention of publishing any thing, till, by the persuasion of his friends, he prepared his Elements of Algebra for the press; which, after his death, were published by subscription in 2 vols. 4to. 1740.

He left many other writings, though none perhaps prepared for the press. Among these were some valuable comments on Newton's

Principia, which not only explain the more difficult parts, but often improve upon the doctrines. These are published in Latin at the end of his posthumous Treatise on Fluxions, a valuable work, published in 8vo, 1756. His manuscript lectures too, on most parts of natural philosophy, might make a considerable volume, and prove an acceptable present to the public if printed.

Dr. Saunderson, as to his character, was a man of much wit and vivacity in conversation, and esteemed an excellent companion. He was endued with a great regard to truth; and was such an enemy to disguise, that he thought it his duty to speak his thoughts at all times with unrestrained freedom. Hence his sentiments on men and opinions, his friendship or disregard, were expressed without reserve; a sincerity which raised him many enemies.

A blind man, moving in the sphere of a mathematician, seems a phenomenon difficult to be accounted for, and has excited the admiration of every age in which it has appeared. Tully mentions it as a thing scarcely credible in his own master in philosophy, Diodotus; that he exercised himself in it with more assiduity after he became blind; and, what he thought next to impossible to be done without sight, that he professed geometry, describing his diagrams so exactly to his scholars, that they could draw every line in its proper direction. St. Jerome relates a still more remarkable instance in Didymus of Alexandria, who, though blind from his infancy, and therefore ignorant of the very letters, not only learned logic, but geometry also, to a very great perfection, which seems most of all to require sight. But, if we consider that the ideas of extended quantity, which are the chief objects of mathematics, may as well be acquired by the sense of feeling as that of sight, that a fixed and steady attention is the principal qualification for this study, and that the blind are, by necessity, more abstracted than others, (for which reason, it is said, that Democritus put out his eyes, that he might think more intensely), we shall perhaps find reason to suppose that there is no branch of science so much adapted to their circumstances.

At first, Dr. Saunderson acquired most of his ideas by the sense of feeling; and this, as is commonly the case with the blind, he enjoyed in great perfection. Yet he could not, as some are said to have done, distinguish colours by that sense; for, after having made repeated trials, he used to say, it was pretending to impossibilities. But he could with great nicety and exactness observe the smallest degree of roughness, or defect of polish, in a surface. Thus, in a set of Roman medals, he distinguished the genuine from the false, though they had been counterfeited with such exactness as to deceive a connoisseur who had judged from the eye. By the sense of feeling also, he distinguished the least variation; and he has been seen in a garden, when observations have been making on the sun, to take notice of every cloud that interrupted the observation, almost as justly as they who could see it. He could also tell when any thing was held near his face, or when he passed by a tree at no great distance, merely by the different impulse of the air on his face.

His ear was also equally exact. He could readily distinguish the 5th part of a note. By the quickness of this sense he could judge of the size of a room, and of his distance from the wall. And if ever he walked over a pavement, in courts or piazzas which reflected a sound, and was afterwards conducted thither again, he could tell in what part of the walk he had stood, merely by the note it sounded.

Dr. Saunderson had a peculiar method of performing arithmetical calculations, by an ingenious machine and method which has been called his Palpable Arithmetic, and is particularly described in a piece prefixed to the first volume of his Algebra. See BLINDNESS.

To SA'UNTER. *v. n.* (*aller à la sainte terre*, going to the holy land.) 1. To wander about idly (*Prior*). 2. To loiter; to linger (*Locke*).

SAVONA, a strong town of the territory of Genoa, with a citadel on a rock, and several fine churches. The Genoese, fearing that it would hurt their trade, ruined the harbour, and rendered it unfit for large vessels. It was taken by the king of Sardinia in 1746, restored in 1748, taken by the French in 1795, and by them surrendered to the Austrians in 1800, through famine. It is seated on the Mediterranean, 24 miles W.S.W. of Genoa. Lon. 8. 20 E. Lat. 44. 18 N.

SA'VOUR. *s.* (*saveur*, French.) 1. Scent; odour (*Arbuthnot*). 2. Taste; power of affecting the palate (*Milton*).

To SA'VOUR. *v. n.* (*savourer*, French.) 1. To have any particular smell or taste. 2. To betoken; to have an appearance or intellectual taste of something (*Denham*).

To SA'VOUR. *v. a.* 1. To like; to taste or smell with delight (*Shakspeare*). 2. To exhibit taste of (*Matthew*).

SA'VOURILY. *ad.* (from *savoury*.) 1. With gust; with appetite (*Dryden*). 2. With a pleasing relish (*Dryden*).

SA'VOURINESS. *s.* (from *savoury*.) 1. Taste pleasing and picquant. 2. Pleasing smell.

SA'VOURY. *a.* (*savoureaux*, French; from *savour*.) 1. Pleasing to the smell (*Milton*). 2. Picquant to the taste (*Genesis*).

SAVOURY, SAVORY. See SATUREIA.

SAVOY CABBAGE. See BRASSICA.

SAVOY SPEDERWORT. See ANTHERICUM.

SAVOY, a duchy of Europe, between France and Italy, 83 miles long and 67 broad; bounded on the N. by the lake of Geneva, which separates it from Swisserland; on the E. by the Alps, which divides it from Piedmont and Vallais; on the W. by the Rhone, which parts it from Bresse; and on the S. by Dauphiny and Piedmont. The air is cold on account of high mountains, which are almost

always covered with snow; but the soil is pretty fertile. The mountains which are not covered with snow in winter abound with pastures that feed a vast number of cattle. There are also stags, fallow deer, roebucks, wild boars, bears, marmots, white hares, red and gray partridges, woodcocks, and pheasants. The lakes are full of fish, and the principal rivers are the Isere, Arc, and Arve. The French invaded this country in 1792, and the same year, the National Convention decreed, that it should be an 84th department of France, by the name of Mont Blanc. Chamberry is the capital.

SAURIN (James), the son of an eminent Protestant lawyer, was born at Nismes in 1677. His father retired, after the repeal of the edict of Nantz, to Geneva, at which place he died. Saurin made no small progress in his studies, but abandoned them for some time, that he might follow arms. In 1694, he made a campaign as a cadet in lord Galloway's company, and soon afterwards procured a pair of colours. But as soon as the duke of Savoy had concluded a peace with France, Saurin quitted a profession for which he never was designed; and, on his return to Geneva again, applied himself to philosophy and divinity, under Turretin and other professors. In 1700 he visited both Holland and England. In this last country he made a long stay; and in 1703 marrying, returned to the Hague in 1705. He was possessed of great talents, to which were added a fine address, a harmonious voice, and a most eloquent unaffected style. He published five volumes of sermons at different times; and since his death, which happened at the Hague, December 30, 1730, two other volumes appeared. The whole of these have been translated into the English language by Robinson and others. He also drew up, by the advice of a friend, who was preceptor to the children of George II. when prince of Wales, a Treatise on Education, to which he prefixed a dedication to the young princes. This, though never printed, was followed by a handsome present from the princess of Wales. He obtained also a pension from the king, to whom he had inscribed the third volume of his sermons. In 1727 he published The State of Christianity in France. But his most considerable work, and which occasioned much controversy, was, Discourses historical, critical, and moral, on the most memorable Events of the Old and New Testament. Proposals for translating this work into English have been issued by the rev. F. A. Cox, but the translation has not yet appeared.

SAURURUS. Lizard's tail. In botany, a genus of the class heptandria, order tetragynia. Calyx an ament with the scales one-flowered; corolless; germs four; berries four, one-seeded. One species, a native of Virginia, ament-scales petioled, white in flowering.

SA'USAGE. *s.* (*saucisse*, French; *salsum*, Latin.) A roll or ball made commonly of pork or veal minced very small, with salt and spice.

SAUSSURE (Horace Benedict de), was born at Geneva, 1740. At the age of 21 he was elected philosophical professor at Geneva, and continued there with great public advantage for 25 years. He first visited Paris in 1768, and next examined the discoveries of Montgolfier at Lyons, and travelled through Holland, Belgium, England, and Italy. He visited the island of Elba, and with sir William Hamilton, examined Vesuvius, and afterwards measured the crater of Ætna. He discovered some valuable plants, and also invented various instruments, in the operations of science and of art. His next excursions were on the Alps, and after crossing them 14 times by eight different places, he ascended to the summit of Mont Blanc, where he could scarce breathe. He was made member of the academy of sciences at Paris, &c. and the emperor Joseph, when at Geneva, paid particular attention to the philosopher. In the French revolution he was elected, on the union of his country to France, to the national assembly; but the disorders of the times ruined his little fortune, and broke his heart, 1799. He is author of an Eulogy on his friend Bonnet, 8vo. Dissertatio Physica de igne; Inquiry on the Bark of Leaves, &c.; Dissertatio physica de Electricitate, 8vo.; Plan of Reform for the College of Geneva; Description of the electrical Effects of Thunder; Essay on Hygrometry, 4to.; Voyages in the Alps, 4 vols. 4to., a valuable work, &c.

SAVU, an island in the Indian Ocean, to which the Dutch have a kind of exclusive trade, having entered into an agreement with the rajahs, that their subjects shall trade with no ships but those of the Dutch East India company. Lon. 122. 30 E. Lat. 10. 35 S.

SAUVAGES (Francis Boissier de), of Alais, was professor of botany and medicine at Montpellier. He died at Montpellier, 1767, aged 61. He wrote Theoria Febris; Nosologia Methodica, 5 vols. 8vo.; Physiologiæ Mechanicæ Elementa, 12mo.; Methodus Foliorum, 8vo. &c.

SAUVAGESIA. In botany, a genus of the class pentandria, order monogynia. Corol five-petalled, fringed; calyx five-leaved; nectary five-leaved, alternating with the petals; capsule one-celled. One species, a West Indian plant, with erect stem, one-flowered, lateral peduncles, deflected when in fruit.

SAUVEUR (Joseph), an eminent French mathematician, born at La Fleche, in 1653. He was absolutely dumb until he was seven years of age; and even then his organs of speech did not disengage themselves so freely, but that he was ever after obliged to speak with great deliberation. Mathematics were the only studies he had any relish for, and these he cultivated with extraordinary success; so that he commenced teacher at 20 years of age, and was so soon in vogue, that he had prince Eugene for his scholar. He was made mathematical professor in the royal college in 1686; and ten years afterwards was admitted a member of the Academy of Sciences. He died in 1716; and his writings, which consist

rather of detached papers than of connected treatises, are all inserted in the Memoirs of the Academy of Sciences. He was twice married; and by the last wife had a son, who, like himself, was dumb for the first seven years of his life.

SAW, an instrument which serves to cut into pieces several solid matters; as wood, stone, ivory, &c. The best saws are of tempered steel ground bright and smooth; those of iron are only hammer-hardened: hence, the first, besides their being stiffer, are likewise found smoother than the last. They are known to be well hammered by the stiff bending of the blade; and to be well and evenly ground, by their bending equally in a bow. The edge in which are the teeth is always thicker than the back, because the back is to follow the edge. The teeth are cut and sharpened with a triangular file, the blade of the saw being first fixed in a whetting-block. After they have been filed the teeth are set, that is, turned out of the right line, that they may make the kerf or fissure the wider, that the back may follow the better. The teeth are always set ranker for coarse cheap stuff than for hard and fine, because the ranker the teeth are set, the more stuff is lost in the kerf. The saws by which marble and other stones are cut have no teeth: these are generally very large, and are stretched out and held even by a frame.

The lapidaries, too, have their saw, as well as the workmen in mosaic; but of all mechanics, none have so many saws as the joiners: the chief are as follows: The pit-saw, which is a large two-handed saw, used to saw timber in pits; this is chiefly used by the sawyers. The whip-saw, which is also two-handed, used in sawing such large pieces of stuff as the hand-saw will not easily reach. The hand-saw, which is made for a single man's use, of which there are various kinds; as the bow, or frame saw, which is furnished with cheeks: by the twisted cords which pass from the upper parts of these cheeks, and the tongue in the middle of them, the upper ends are drawn closer together, and the lower set further apart. The tenon-saw, which being very thin, has a back to keep it from bending. The compass-saw, which is very small, and its teeth usually not set; its use is to cut a round, or any other compass-kerf: hence the edge is made broad, and the back thin, that it may have a compass to turn in.

The surgeons use a saw to cut off bones: this should be very small and light, in order to be managed with the greater ease and freedom, the blade exceedingly fine, and the teeth exquisitely sharpened, to make its way more gently, and yet with great expedition, in cutting off legs, arms, &c.

Saws are now generally used by butchers in separating the bones of the meat: the divisions by the saw are neater than those by the chopper, and there is a certain saving, as the chopper splinters bones, the parts of which cannot be included in the weight.

SAW-MILLS. In early periods, the trunks of trees were split with wedges, into as many and as thin pieces as possible; and if it was necessary to have them still thinner, they were hewn on both sides to the proper size. This simple and wasteful manner of making boards has been still continued in some places, to the present time. Peter the Great of Russia endeavoured to put a stop to it, by forbidding hewn deals to be transported on the river Neva. The saw, however, though so convenient and beneficial, has not been able to banish entirely the practice of splitting timber used in building, or in making furniture and utensils, for we do not speak here of fire-wood; and, indeed, it must be allowed that this method is attended with peculiar advantages, which that of sawing can never possess. The wood-splitters perform their work more expeditiously than sawyers, and split timber is much stronger than that which has been sawn; for the fissure follows the grain of the wood, and leaves it whole; whereas the saw, which proceeds in the line chalked out for it, divides the fibres, and by these means lessens its cohesion and solidity. Split timber, indeed, turns out often crooked and warped: but in many purposes to which it is applied this is not prejudicial; and these faults may sometimes be amended. As the fibres, however, retain their natural length and direction, thin boards, particularly, can be bent much better. This is a great advantage in making pipe-staves, or sieve-frames, which require still more art, and in forming various implements of the like kind.

Our common saw, which needs only to be guided by the hand of the workman, however simple it may be, was not known to the inhabitants of America when they were subdued by the Europeans. The inventor of this instrument has, by the Greeks, been inserted in their mythology, with a place in which, among their gods, they honoured the greatest benefactors of the earliest ages. By some he is called Talus, and by others Perdix. Pliny alone ascribes the invention to Dædalus; but Hardouin, in the passage where he does so, chooses to read Talus rather than Dædalus. Diodorus Siculus, Apollodorus, and others, name the inventor Talus. He was the son of Dædalus's sister: and was by his mother placed under the tuition of her brother, to be instructed in his art. Having once found the jaw-bone of a snake, he employed it to cut through a small piece of wood; and by these means was induced to form a like instrument of iron, that is, to make a saw. This invention, which greatly facilitates labour, excited the envy of his master, and instigated him to put Talus to death privately. We are told, that being asked by some one, when he was burying the body, what he was depositing in the earth, he replied, "A serpent." This suspicious answer discovered the murder; and thus, adds the historian, a snake was the cause of the invention, of the murder, and of its being found out.

Others call the inventor Perdix. That he

was the son of a sister of Dædalus they all agree; but they differ respecting the name of his parents. The mother is, by Fulgentius, called Polycastes, but without any proof; and Lactantius gives to the father the name of Calaus. In Apollodorus, however, the mother of Talus is called Perdix: and the same name is given by Tzetzes to the mother of the inventor, whose name Talus he changes into Attalus. Perdix, we are told, did not employ for a saw the jaw-bone of a snake, like Talus, but the back-bone of a fish; and this is confirmed by Ovid, who, nevertheless, is silent respecting the name of the inventor.

The saws of the Grecian carpenters had the same form, and were made in the like ingenious manner as ours are at present. This is fully shewn by a painting still preserved among the antiquities of Herculaneum. Two genii are represented at the end of a bench, which consists of a long table that rests upon two four-footed stools. The piece of wood which is to be sawn through is secured by cramps. The saw with which the genii are at work has a perfect resemblance to our frame-saw. It consists of a square frame, having in the middle a blade, the teeth of which stand perpendicular to the plane of the frame. The piece of wood which is to be sawn extends beyond the end of the bench, and one of the workmen appears standing, and the other sitting on the ground. The arms, in which the blade is fastened, have the same form as that given to them at present. In the bench are seen holes, in which the cramps that hold the timber are struck. They are shaped like the figure 7; and the ends of them reach below the boards that form the top of it.

The most beneficial and ingenious improvement of this instrument was, without doubt, the invention of saw-mills, which are driven either by water or by the wind. Mills of the first kind were erected so early as the fourth century, in Germany, on the small river Roeur or Ruer: for though Ausonius speaks properly of water-mills for cutting stone, and not timber, it cannot be doubted that these were invented later than mills for manufacturing deals, or that both kinds were erected at the same time. The art, however, of cutting marble with a saw is very old. Pliny conjectures that it was invented in Caria; at least he knew no building incrusted with marble of greater antiquity than the palace of king Mausolus, at Halicarnassus. This edifice is celebrated by Vitruvius, for the beauty of its marble; and Pliny gives an account of the different kinds of sand used for cutting it; for it is the sand properly, says he, and not the saw, which produces that effect. The latter presses down the former, and rubs it against the marble; and the coarser the sand is, the longer will be the time required to polish the marble which has been cut by it. Stones of the soap-rock kind, which are indeed softer than marble, and which would require less force than wood, were sawn at that period: but it appears that the far harder glassy kinds of stone were sawn then also; for we are told of the discovery of a building which was encrusted with cut agate, cornelian, lapis lazuli, and amethysts. We have, however, found no account in any of the Greek or Roman writers of a mill for sawing wood; and as the writers of modern times speak of saw-mills as new and uncommon, it would seem that the oldest construction of them has been forgotten, or that some important improvement has made them appear entirely new.

Becher says, with his usual confidence, that saw-mills were invented in the 17th century. In this he erred, for when the infant Henry sent settlers to the island of Madeira, which was discovered in 1420, and caused European fruits of every kind to be carried thither, he ordered saw-mills to be erected also, for the purpose of sawing into planks the various species of excellent timber with which the island abounded, and which were afterwards transported to Portugal. About the year 1427, the city of Breslau had a saw-mill, which produced a yearly rent of three marks; and in 1490 the magistrates of Erfurt purchased a forest, in which they caused a saw-mill to be erected, and they rented another mill in the neighbourhood besides. Norway, which is covered with forests, had the first saw-mill about the year 1530. This mode of manufacturing timber was called the new art; and because the exportation of deals was by these means increased, that circumstance gave occasion to the deal-tythe, introduced by Christian III. in the year 1545. Soon after, the celebrated Henry Canzau caused the first mill of this kind to be built in Holstein. In 1552 there was a saw-mill at Joachimsthal, which, as we are told, belonged to Jacob Geusen, mathematician. In the year 1555 the bishop of Ely, ambassador from Mary queen of England to the court of Rome, having seen a saw-mill in the neighbourhood of Lyons, the writer of his travels thought it worthy of a particular description. In the sixteenth century, however, there were mills with different saw-blades, by which a plank could be cut into several deals at the same time. The first saw-mill was erected in Holland at Saardam, in the year 1596; and the invention of it is ascribed to Cornelius Cornelissen. Perhaps he was the first person who built a saw-mill at that place, which is a village of great trade, and has still a great many saw-mills, though the number of them is becoming daily less; for within the last thirty years a hundred have been given up. The first mill of this kind in Sweden was erected in the year 1653. At present, that kingdom possesses the largest perhaps ever constructed in Europe, where a water-wheel, twelve feet broad, drives at the same time seventy-two saws.

In England saw-mills had at first the same fate that printing had in Turkey, the ribbon-loom in the dominions of the church, and the crane at Strasburg. When attempts were made to introduce them, they were violently opposed, because it was apprehended that the

sawyers would be deprived by them of their means of getting a subsistence. For this reason, it was found necessary to abandon a saw-mill erected by a Dutchman near London, in 1663; and in the year 1700, when one Houghton laid before the nation the advantages of such a mill, he expressed his apprehension that it might excite the rage of the populace. What he dreaded was actually the case in 1767 or 1768, when an opulent timber-merchant, by the desire and approbation of the Society of Arts, caused a saw-mill, driven by wind, to be erected at Limehouse, under the direction of James Stansfield, who had learned, in Holland and Norway, the art of constructing and managing machines of that kind. A mob assembled, and pulled the mill to pieces; but the damage was made good by the nation, and some of the rioters were punished. A new mill was afterwards erected, which was suffered to work without molestation, and which gave occasion to the erection of others. It appears, however, that this was not the only mill of the kind then in Britain; for one driven also by wind had been built at Leith, in Scotland, some years before.

Saw-mills, as they are now generally constructed, are of two kinds, according as the saws employed effect their operation by a circular or by a reciprocating motion. Circular saw-mills are the most simple in their construction, while they are latest in point of invention. Mr. George Smart, at his manufactory for hollow masts on the Surrey side of Westminster Bridge, has several of these. In one of the simplest, the machine is turned by a horse-wheel, which gives motion to a pinion on a horizontal shaft; a spur wheel is fixed on this shaft, and turns a pinion on another horizontal shaft, on which a wheel is fixed in the room over the machine, and the bearings for the gudgeons of the shaft are supported on the joists of the floor: by means of an endless strap passing round this wheel, and also round a pulley, on the spindle of the circular saw, a rapid motion is given to the saw, which is made of well-tempered steel plate, with teeth on its edge: it is fixed on its spindle by a shoulder, against which it is held by another moveable shoulder pressed against the other by a nut, on the end of the spindle which is tapped into a screw to receive it. The saw has a circular hole through the middle, fitting tight upon the spindle, and a small fillet fitting into a notch causes them to turn together.

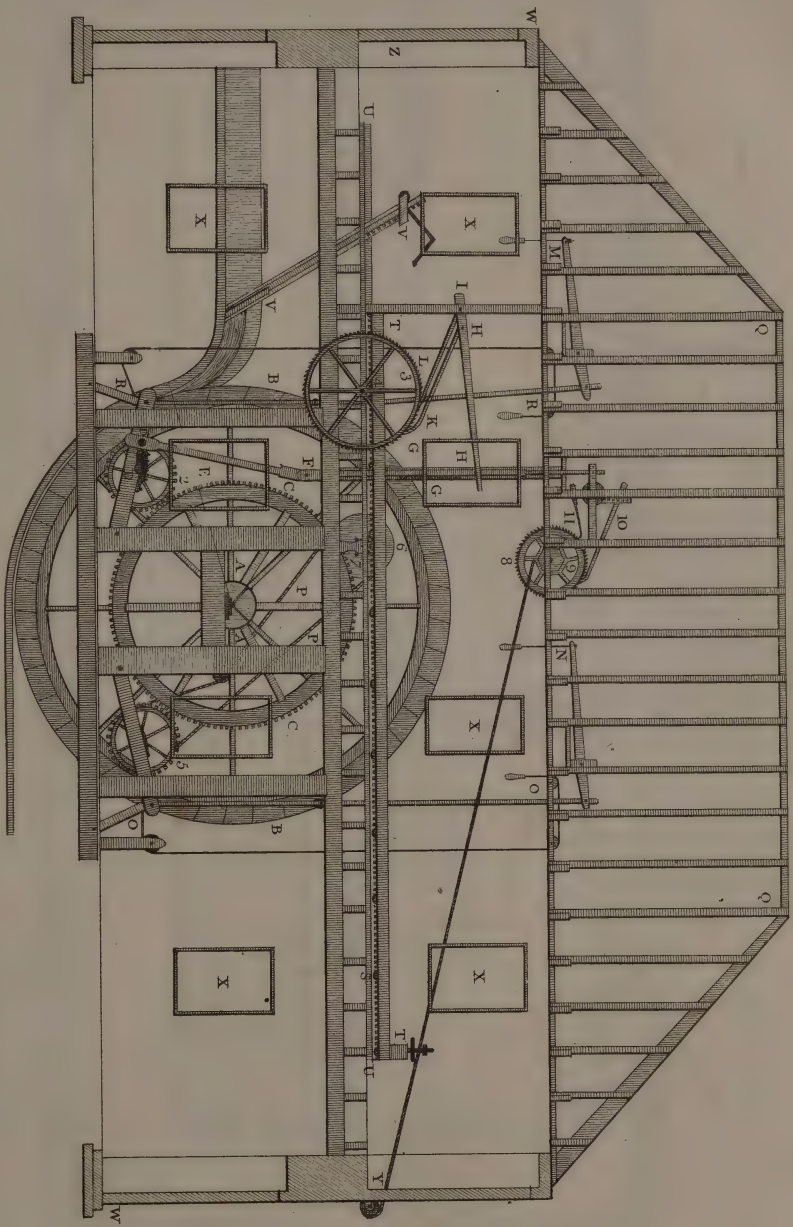
The ends of the spindle are pointed, and that point nearest the saw works in a hole made in the end of a screw screwed in a bench made of stout planks, and well braced together; the other turns in a similar screw screwed through a cross beam morticed between two vertical beams, extending from the floor to the ceiling: one of the cross beams can be raised or lowered in its mortices by wedges put both above and below its tenons. In order to adjust the plane of the saw perpendicular to the plane of the bench, there is a long parallel ruler, which can be set at any distance from the saw, and fixed by screws going through circular grooves cut through the bench. In using the machine, the ruler is to be set the proper distance from the saw of the piece of wood to be cut, and as the saw turns round, a workman slides the end of a piece of wood to it, keeping its edge against the guide or ruler, that it may cut straight.

When the saw requires sharpening, one of the screws at the end of its spindle must be turned back: the spindle and saw can be then removed; and by taking off the nut, *k*, the saw will be loose, and may be fixed in a common vice to whet it, in the same manner as a common saw: the teeth of the saw are set, that is, bent out of the plane of the saw, one tooth on one side, the next on the other: the outsides of the teeth are not filed to leave a surface perpendicular to the plane of the saw, but inclined to it, and in the same direction that each tooth so filed is bent in the setting: by this means the saw, when cutting, first takes away the wood at the two sides of the kerf, leaving an angular ridge in the middle of it, the use of which is to keep the saw steady in a right line, that it may not have so much tendency to get out of the straight in any place where the wood is harder at one side than on the other.

Some of Mr. Smart's circular saws are more complex in their construction: a description of one of them with a drawing may be seen in the 2d volume of Gregory's Mechanics.

Reciprocating saw-mills do not exhibit much variety in their construction, except in so far as the first mover employed, or the nature and use of the substances to be cut, may occasion such variety. The saw-mill represented in plates 151 and 152 is described in Gray's Experienced Millwright, but it only differs in a few trifling particulars from some which are described in Belidor's Architecture Hydraulique, and Gallon's Collection of Machines approved by the French Academy.

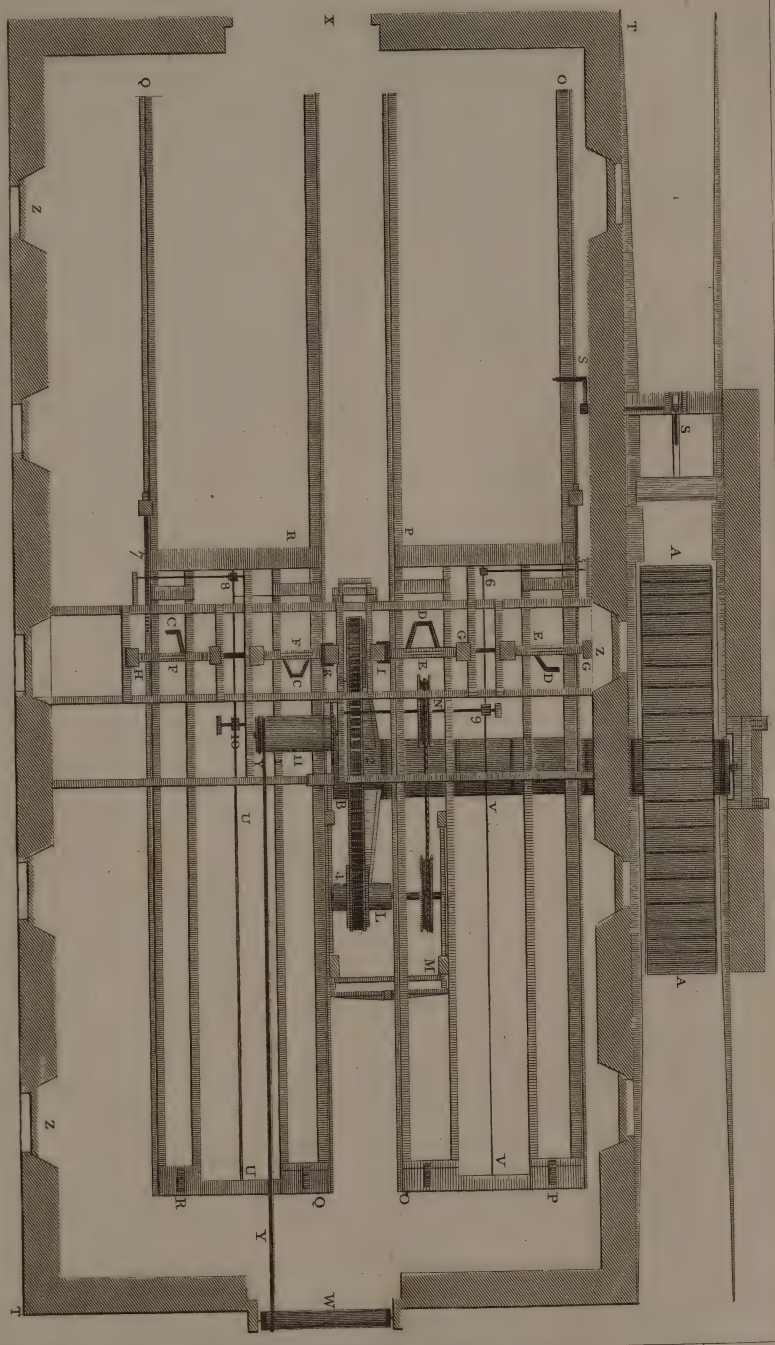
Plate 151 shows the elevation of the mill. AA the shaft or axle, upon which is fixed the wheel BB (of 17½ or 18 feet diameter), containg 40 buckets to receive the water which impels it round. CC a wheel fixed upon the same shaft containing 96 teeth, to drive the pinion No. 2. having 22 teeth, which is fastened upon an iron axle or spindle, having a coupling box on each end that turns the cranks, as DD, round: one end of the pole E is put on the crank, and its other end moves on a joint or iron bolt at F, in the lower end of the frame GG. The crank DD being turned round in the pole E, moves the frames GG up and down, and these having saws in them, by this motion cut the wood. The pinion, No. 2. may work 2, 3, or more cranks, and thus move as many frames of saws. No. 3, an iron wheel having angular teeth, which one end of the iron K takes hold of, while its other end rolls on a bolt in the lever HH. One end of this lever moves on a bolt at I, the other end may lie in a notch in the frame GG so as to be pushed up and down by it. Thus the catch



Mudlow, sc. Rusgell Ct.

London, Published by Sherwood & Co. Paternoster Row, Sep.r 1.st 1812.

SAWMILL.



London, Published by Sherwood & Co. Paternoster Row, Sept. 1st 1812.

K pulls the wheel round, while the catch L falls into the teeth, and prevents it from going backwards. Upon the axle of No. 3. is also fixed the pinion No. 4. taking into the teeth in the under edge of the iron bar, that is fastened upon the frame TT, on which the wood to be cut is laid: by this means the frame TT is moved on its rollers SS, along the fixed frame UU; and of course the wood fastened upon it is brought forward to the saws as they are moved up and down by reason of the turning round of the crank DD. VV, the machine and handle to raise the sluice when the water is to be let upon the wheel BB to give it motion. By pulling the rope at the longer arm of the lever M, the pinion No. 2. is put into the hold or grip of the wheel CC, which drives it; and by pulling the rope R, this pinion is cleared from the wheel. No. 5. a pinion containing 24 teeth, driven by the wheel CC, and having upon its axle a sheave, on which is the rope PP, passing to the sheave No. 6. to turn it round; and upon its axle is fixed the pinion No. 7. acting on the teeth in an iron bar upon the frame TT, to roll that frame backwards when empty. By pulling the rope at the longer arm of the lever N, the pinion No. 5. is put into the hold of the wheel CC; and by pulling the rope O it is taken off the hold. No. 8. a wheel fixed upon the axle No. 9. having upon its periphery angular teeth, into which the catch No. 10. takes; and being moved by the lever attached to the upper part of the frame G, it pushes the wheel No. 8. round; and the catch No. 11. falls into the teeth of the wheel, to prevent it from going backwards while the rope rolls in its axle, and drags the logs or pieces of wood in at the door Y, to be laid upon the moveable frames TT, and carried forward to the saws to be cut. The catches No. 10. 11. are easily thrown out of play when they are not wanted. The gudgeons in the shafts, rounds of the cranks, spindles, and pivots, should all turn round in cods or bushes of brass. Z, a door in one end of the mill-house at which the wood is conveyed out when cut. WW, walls of the mill-house. QQ, the couples or framing of the roof. XXX, &c. windows to admit light to the house.

Plate 152 exhibits a plan of the same mill, and needs no verbal description.

For accounts of other contrivances for saws we must refer to Gregory's Mechanics. See also our article *Stone* PIPE.

SAW-FISH, in ichthyology. See SQUALUS.

SAW-FLY, in entomology. See TENTHREDO.

SAW-WORT, in botany. See SERRATULA.

To SAW. *v. a.* part. *sawed* and *sawn*. (*scier*, Fr. from the noun.) To cut timber or other matter with a saw. (*Moxon*).

SA'WDUST. *s.* (*saw* and *dust*.) Dust made by the attrition of the saw (*Mortimer*).

SA'WPIT. *s.* (*saw* and *pit*.) Pit over which timber is laid to be sawn by two men (*Mortimer*).

SAW-WREST. *s.* (*saw* and *wrest*.) A sort of tool. With the *saw-wrest* they set the teeth of the saw (*Moxon*).

SA'WER. SA'WYER. *s.* (*scieur*, Fr. from *saw*.) One whose trade is to saw timber into boards or beams (*Moxon*).

SAXE (Maurice Count), born at Dresden, in 1696, was the natural son of Frederic Augustus II. king of Poland. He discovered an early genius for warlike exercises, neglecting every other study, and even the acquirement of any other language than French, that he might more profitably pursue the science of tactics. He made several campaigns with his father in Poland, and served so early as 1709, in the Netherlands, under prince Eugene and the duke of Marlborough, and afterwards in the war against the Swedes in Pomerania. Upon the peace of Utrecht he went to France, when the duke of Orleans engaged him to enter into his army, by offering him the brevet of maréchal-de-camp. In 1722 he obtained a regiment in France, and undertook to discipline it himself after a new manner entirely his own. At this time the states of Courland elected him their sovereign, upon which Poland and Russia took up arms against him, and the Czarina sent his rival Menzikoff to Mittaw to besiege him in his palace. He made a gallant defence in his castle, but not having troops to resist the accumulating forces of the two hostile powers, he was obliged to withdraw himself in 1729, and abandon his government. The count now applied himself to the study of the mathematics, and composed his Reveries. Upon the death of his father he joined Marshal Berwick upon the Rhine, who observed to him, "Count, I was going to send for 3000 men to attack the enemy at Etlingen, but you alone are equal to that number." He was at the siege of Philipsburg, and performed various exploits, for the reward of which he was made lieutenant-general in 1734. In 1741 the count took Prague by escalade, and a few days afterwards the fortified town of Agria. In 1744 he was made a marshal of France, and had the chief command of an army in Flanders. He fought the battle of Fontenoy, though so ill at the time, as to be carried in a litter from post to post; after which, he took several important towns. The year before the conclusion of the war, the king of France made him marshal of all his armies, and appointed him governor of all the conquered places in the Low countries. He died in 1750.

SAXENBURG, a town of Germany, in the duchy of Carinthia, situate on the Drave, 38 miles W. of Clagenfurt. Lon. 13. 40 E. Lat. 46. 52 N.

SAXENHAGEN, a town of Westphalia, in the county of Schawenburg, 20 miles N.W. of Hanover. Lon. 9. 36 E. Lat. 52. 30 N.

SAXIFRAGA. Saxifrage. In botany, a genus of the class decandria, order digynia. Calyx five-cleft, permanent; corol five-petalled; capsule two-beaked, one-celled, many-seeded, opening between the beaks. Forty-nine species; two or three natives of America and

China, the rest of Europe; twelve indigenous to the marshes, hills, pastures, rocks, walls or roofs of our own country. They are thus subdivided.

A. Leaves undivided; stem in most naked.
B. Leaves undivided; stem leafy.
C. Leaves lobed; stems erect.
D. Leaves lobed; stems procumbent.
The following are chiefly cultivated.

1. S. cotyledon. Pyramidal saxifrage. Root-leaves aggregate, tongue-shaped, with cartilaginous teeth; stem panicled, leafy; calyx with glandular hairs, about a foot high, purplish; flowers in small clusters at the end of the branches, white, with several red spots in the inside. A native of the Alps. There are several varieties from variety of colour or of leaf.

2. S. granulata. White saxifrage. Leaves kidney-form, lobed; stem panicled; root granulate; germ half inferior. Indigenous to our own pastures; the stem and leaves of a reddish-brown hue.

Linnéus describes the taste of this plant to be acrid and pungent, which we have not been able to discover: neither the tubercles of the root nor the leaves manifest to the organs of taste any quality likely to be of medicinal use, and therefore, though this species of saxifrage has been long employed as a popular remedy in nephritic and gravelly disorders, yet we do not find either from its sensible qualities, or from any published instances of its efficacy, that it deserves a place in the materia medica. The superstitious doctrine of signatures suggested the use of the root, which is a good example of what Linnéus has termed radix granulata. The bulbs or tubercles of such roots answer an important purpose in vegetation, by supplying the plants with nourishment and moisture, and thereby enabling them to resist the effects of that drought to which the dry soils they inhabit peculiarly expose them.

3. S. crassifolia. Thick-leaved saxifrage. Leaves oval, retuse, obsoletely serrate, petioled; stem naked, panicle conglomerate. The scape or peduncle is terminating, solitary, erect, a span high, thick as the little finger, roundish, very smooth, purplish, many-flowered; the flowers inferior, drooping, pedicelled. A native of Siberia.

4. S. umbrosa. London pride. None so pretty. Leaves obovate, bluntish, with a cartilaginous, crenate margin; stem naked, panicled; capsule superior. Indigenous to our own mountains. The scape a span high, erect, red, hairy, many-flowered; the flowers upright; petals obovate-lanceolate, white or flesh-colour, beautifully dotted with yellow and dark red.

5. S. hypnoides. Mossy saxifrage. Ladies cushion. Leaves linear, entire, and three-cleft, shoots procumbent; stem erect; petals elliptic-oblong. Stem solitary, erect, terminating in an upright panicle of a few large white flowers. A native of our own country, flowers in May, and often again sparingly in July or August.

6. S. sarmentosa. Chinese saxifrage. Leaves roundish, toothed, hairy; shoots creeping and rooting; the two lower petals very long, white; the other three smaller, whitish stained with red. A native of China and Japan; flowers in June and July.

7. S. rotundifolia. Round-leaved saxifrage. Stem-leaves kidney-form, tooth-serrate, petioled; stem panicled; flowers white, spotted with red. A beautiful plant indigenous to Switzerland.

The several species of saxifrage, usually cultivated in the gardens, may be propagated by off-sets, which are sent out from the old roots in great plenty. They may be taken off at almost any season, when the weather is mild, and should have a very dry soil, and a shady situation, if they are planted in the full ground: the best season for transplanting them is July. After their leaves are decayed, they should be put into fresh undunged earth, and placed in the shade till autumn. In winter they may however be exposed to the sun.

SAXIFRAGA VULGARIS. Hippomarathrum. Fæniculum erraticum. English or meadow saxifrage. Peucedanum silaus of Linnéus. The roots, leaves, and seeds of this plant have been commended as aperients, diuretics, and carminatives; and appear from their aromatic smell and moderately warm, pungent, bitterish taste, to have some claim to these virtues. They are rarely used. See PEUCEDANUM.

SAXIFRAGE. See SAXIFRAGA.

SAXIFRAGE (Golden). See CHRYSOSPLENIUM.

SA'XIFRAGOUS. *a.* (*saxum* and *frango*, Latin.) Dissolvent of the stone (*Brown*).

SAXMUNDHAM, a town in Suffolk, with a market on Thursday, seated on a hill, 29 miles N.E. of Ipswich, and 89 N.E. of London. Lon. 1. 40 E. Lat. 52. 18 N.

SAXO (Grammaticus). The birth-place of this historian, like that of Homer, has been the subject of much controversy; though Saxo himself calls the Danes his countrymen, and speaking of their kings, terms them, "our kings." This name of Grammaticus was titular, expressive of his literary attainments. He wrote the history of Denmark, and died in 1208.

SAXONY (Upper), a circle of Germany; bounded on the E. by Prussia, Poland, and Lusatia, S. by Bohemia and Franconia, W. by the circles of Upper Rhine and Lower Saxony, and N. by the latter and the Baltic. It comprehends the duchy of Saxony, or Saxony Proper, the margravate of Misnia, the landgravate of Thuringia, the principalities of Brandenburg, Merseburg, Nauburg, Anhalt, Coburg, and Querfurt, the counties of Barby, Mansfeld, Schwartzburg, Stolberg, and Hohenstein, and the duchy of Pomerania.

SAXONY (Lower), a circle of Germany; bounded on the E. by Upper Saxony, S. by the same and the circle of Upper Rhine, W. by Westphalia and the German ocean, and N. by Jutland and the Baltic. It comprehends the

duchies of Magdeburg, Bremen, Brunswick, Luneburg, Holstein, Lauenburg, and Mecklenburg, the principalities of Halberstadt, Ratzeburg, Hildesheim, and Lubec, and the cities of Hamburg, Bremen, Goslar, Mulhausen, and Nordhausen.

Saxony (Proper), or the duchy of Saxony, in the circle of Upper Saxony, is 75 miles long and 62 broad; bounded on the N. by Brandenburg, E. by Lusatia, S. by Misnia, and W. by the principality of Anhalt. It is a very fertile and trading country, abounding in mines; and is cut into two unequal parts by the river Elbe. Wittenberg is the capital. This duchy is only a small part of the dominions belonging to the duke of Saxony; he has also Lusatia, Misnia, the greatest part of Thuringia, part of Voigtland, and part of the counties of Mansfeld and Henneberg; beside other cessions from Prussia, both in Germany and Poland, by the late treaty of Tilsit. The capital of his German dominions is Dresden.

To SAY. *v. a.* preter. *said*. (secgan, Saxon; *seggen*, Dutch.) 1. To speak; to utter in words; to tell (*Spenser*). 2. To allege by way of argument (*Atterbury*). 3. To tell in any manner (*Spenser*). 4. To repeat; to rehearse: as, to *say* a part; to *say* a lesson. 5. To pronounce without singing (*Common Prayer*).

To Say. *v. n.* 1. To speak; to pronounce; to utter; to relate (*Clarendon*). 2. In poetry, *say* is often used before a question; tell (*Swift*).

Say. *s.* (from the verb.) 1. A speech; what one has to say (*L'Estrange*). 2. (for *assay*.) Sample (*Sidney*). 3. Trial by a sample (*Boyle*). 4. (*soie*, French.) Silk: obsolete. 5. A kind of woollen stuff.

SAYBROOK, a town of Connecticut, in Middlesex county, with a fort. It is the most ancient town in the state, and situate near the mouth of Connecticut river, 18 miles W. by S. of New London. Lon. 72. 25 W. Lat. 41. 20 N.

SAYCOCK, one of the islands of Japan, divided from Niphon by a narrow channel. The Dutch factors are permitted to reside in the little island of Disnia, which is on the W. side of this. Lon. 132. 28 E. Lat. 34. 0 N.

SA'YING. *s.* (from *say*.) Expression; words; opinion sententiously delivered (*Tillotson*).

SAYN, a town and castle of Germany, in the Westerwald, which gives name to a small county. It is situate on the river Sayn, near its junction with the Rhine, six miles N. of Coblentz, and 50 N.W. of Frankfort.

SAYPAN, one of the Ladrone islands, the pleasantest and most fertile of them all. It is 40 miles in circuit, and on the W. side is a safe port called Cantanhitda. Lon. 146. 10 E. Lat. 15. 22 N.

SCAB. A hard substance covering superficial ulcerations, and formed by a concretion of the fluid discharged from them.

Scab, among horses, a species of mange become inveterately dry and scabby by its duration.

SCA'BBARD. *s.* (*schab*, German. *Junius*.) The sheath of a sword (*Fairfax*).

SCA'BBED. *a.* (from *scab*.) 1. Covered or diseased with scabs (*Bacon*). 2. Paltry; sorry; vile; worthless (*Dryden*).

SCA'BBEDNESS. *s.* (from *scabbed*.) The state of being scabby.

SCA'BBINESS. *s.* (from *scabby*.) The quality of being scabby.

SCA'BBY. *a.* (from *scab*.) Diseased with scabs (*Dryden*).

SCABIES. The itch. A synonym of psora. See Psora.

SCABIOSA. Scabious. In botany, a genus of the class tetrandria, order monogynia. Common calyx many-leaved; proper double, superior; receptacle chaffy or naked. Forty-one species; natives for the most part of warm climates, chiefly of the Levant: three indigenous to our own pastures. They are thus subdivided.

A. Corollets four-cleft.

B. Corollets five-cleft.

The species chiefly cultivated are,

1. S. Alpina. Alpine scabious.
2. S. leucantha. Snowy scabious.
3. S. succisa. Devil's-bit scabious.
4. S. integrifolia. Red-flowered annual scabious.
5. S. tartarica. Giant scabious.
6. S. gramuntia. Cut-leaved scabious.
7. S. stellata. Starry scabious.
8. S. atropurpurea. Sweet scabious.
9. S. argentea. Silvery scabious.
10. S. graminifolia. Grass-leaved scabious.
11. S. Africana. African scabious.
12. S. Cretica. Cretan scabious.

The annual sorts of this genus may be propagated by sowing their seeds in a moist, shady border; after which they will in general require no other culture, but to keep them clean from weeds, and allow them room to spread. The perennial sorts may be propagated by parting their roots in autumn, and planting them in a soft, loamy soil, and a shady situation, or by slips, which should be planted in a shady border the beginning of April. When they have put out good roots, they may be taken up with balls of earth, and transplanted where they are to remain.

SCABIOUS, in botany. See Scabiosa.

Sca'bious. *a.* (*scabiosus*, Latin.) Itchy; leprous (*Arbuthnot*).

SCABRIDÆ. The name of the twentieth order in Linnæus's Fragments; and of the fifty-third in his Natural Orders.

SCABRITIES, in botany. Ruggedness. Componitur particulis, nudis oculis vix manifestis, quibus adspergitur plantarum superficies. —A sort of pubescence, composed of particles scarcely visible to the naked eye, scattered over the surface of vegetables.

SCA'BROUS. *a.* (*scaber*, Latin.) 1. Rough; rugged; pointed on the surface (*Arbuthnot*). 2. Harsh; unmusical (*Ben Jonson*).

SCA'BROUSNESS. *s.* (from *scabrous*.) Roughness; ruggedness.

SCAD, in ichthyology. See Scomber.

SCÆVOLA, in botany, a genus of the class pentandria, order monogynia. Corol one-pe-

talled, the tube longitudinally cloven; border five-cleft, lateral; drupe inferior, one-seeded; nut two-celled. Three species; natives of India.

SCA'FFOLD. *s.* (*eschafaut*, Fr. *schavot*, Dutch, from *schawen*, to show.) 1. A temporary gallery or stage raised either for shows or spectators (*Milton*). 2. The gallery raised for execution of great malefactors (*Sidney*). 3. Frames of timber erected on the side of a building for the workmen (*Swift*).

To SCA'FFOLD. *v. a.* (from the noun.) To furnish with frames of timber.

SCA'FFOLDAGE. *s.* (from *scaffold.*) Gallery; hollow floor (*Shakspeare*).

SCA'FFOLDING. *s.* (from *scaffold.*) 1. Temporary frames or stages (*Pope*). 2. Building slightly erected (*Prior*).

SCALA (Barthelemi), an Italian statesman and man of letters, born about 1424. He was the son of a miller; but being patronized by the family of the Medici, he acquired a good education, and was raised to several great posts. He died in 1487. He wrote a history of Florence.

SCALA TYMPANI, in anatomy. The superior spiral cavity of the cochlea.

SCALA VESTIBULI. The inferior spiral cavity of the cochlea.

SCALA-NOVA (anciently Neapolis), called by the Turks Koushadase, is situated in a bay on the slope of a hill, the houses rising one above another, intermixed with minarets and tall slender cypresses. "A street, through which we rode (says Dr. Chandler), was hung with goat-skins exposed to dry, dyed of a most lively red. At one of the fountains is an ancient coffin used as a cistern. The port was filled with small craft.—Before it is an old fortress on a rock or islet frequented by gulls and sea-mews. By the water-side is a large and good khau, at which we passed a night on our return. This place belonged once to the Ephesians, who exchanged it with the Samians for a town in Caria."

SCALA'DE. SCALA'DO. *s.* (Fr. *scalada*, Spanish; from *scalu*, Latin, a ladder.) A storm given to a place by raising ladders against the walls (*Arbuthnot*).

SCA'LARY. *a.* (from *scala*, Latin.) Proceeding by steps like those of a ladder (*Brown*).

To SCALD. *v. a.* (*scaldare*, Italian.) To burn with hot liquor (*Dryden*).

SCALD. *s.* (from the verb.) Scurf on the head (*Spenser*).

SCALD. *a.* Paltry; sorry; scurvy (*Shakspeare*).

SCALD. The name given by the ancient northern nations to their bards, whose employment it was to compose those odes and hymns which were chanted at every public solemnity. These songs were, in general, descriptive of eminent exploits, and were animated by an enthusiastic spirit.

SCALD-CREAM, sometimes also called clouted-cream: a curious method of preparing cream for butter, almost peculiar to Devonshire. Dr. Hales, in Philosophical Transactions, volume xlix. p. 342, 1755, part 1st, gives some account of the method of preparing this delicate and luxurious article: other writers also speak of it. With an elucidation or two, we shall nearly quote Mr. Feltham's account from the Gentleman's Magazine, vol. lxi. part 2. It is there observed, that the purpose of making scald-cream is for superior butter than can be procured from the usual raw cream, being preferable for flavour and keeping; to which those accustomed are so partial, as seldom to eat any other. As leaden cisterns would not answer for scalding cream, the dairies mostly adopt brass pans, which hold from three to five gallons, for the milk; and that which is put into those pans one morning, stands till the next, when, without disturbing it, it is set over (on a trivet) a steady brisk wood fire devoid of smoke, where it is to remain from seven to fifteen minutes, according to the size of the pan, or the quantity in it: the precise time of removing it from the fire must be particularly attended to, and is when the surface begins to wrinkle or to gather in a little, showing signs of being near the agitation of boiling, which it must by no means do; it is then instantly to be taken off, and placed in the dairy until the next morning, when the fine cream is thrown up, and may be taken for the table, or for butter, into which it is now soon converted by stirring it with the hand. Some know when to remove it from the fire by sounding the pan with the finger, it being then less sonorous; but this is only acquired by experience. Dr. Hales observes, that this method of preparing milk will take off the ill taste it sometimes acquires from the cows feeding on turnips, cabbage, &c.

SCALD HEAD. The vulgar name for tinea capitis. See TINEA CAPITIS.

SCALDING, among farriers, the application of stimulating medicines, generally escharotics, in a state of scalding heat, to the disease called poll-evil, as well as to other foul ulcers, in order to produce a change of action in the diseased organ. It is a cruel and unnecessary operation, as the end it aims at may be better accomplished by milder means.

SCALE. (rcale, Saxon; *scael*, Dutch.) 1. A balance; a vessel suspended by a beam against another vessel (*Shakspeare*). 2. The sign Libra in the zodiac (*Creech*). 3. (*escaille*, Fr. *squama*, Lat.) A small shell or crust, of which many lying one over another make the coats of fishes (*Drayton*). 4. Any thing exfoliated or desquamated; a thin lamina (*Pea.*). 5. (*scala*, a ladder, Latin.) Ladder; means of ascent (*Milton*). 6. The act of storming by ladders (*Milton*). 7. Regular gradation; a regular series rising like a ladder (*Addison*). 8. A figure subdivided by lines like the steps of a ladder, which is used to measure proportions between pictures and the thing represented (*Graunt*). 9. The series of harmonic or musical proportions (*Temple*). 10. Any thing marked at equal distances (*Shakspeare*).

To SCALE. *v. a.* (from the noun.) 1. To climb as by ladders (*Knolles*). 2. To measure

to compare; to weigh (*Shakspeare*). 3. To strip off scales; to take off in a thin lamina (*Tobit*). 4. To pare off a surface (*Burnet*).

To SCALE. *v. n.* To peel off in thin particles (*Bacon*).

Some of these acceptations must be enlarged upon, as below.

SCALE, in anatomy. (*squama.*) A lamina of morbid cuticle, hard, thickened, whitish, and opake, having at first the figure and extent of the cuticular lozenge; which afterwards often increases into irregular layers, denominated crusts. Both scales and crusts repeatedly fall off, and are reproduced in a short time.

SCALES OF NOTATION, in arithmetic, may vary almost indefinitely, according to the root assumed: as the binary scale, or that in which 2 is the root or highest figure: the ternary scale, in which 3 is the highest figure, &c. Besides the decimal scale, which is that of our usual notation, the duodenary, and the sexagenary, are the most frequent; the former being used by artificers, the latter by astronomers.

A number expressed by any one scale is easily reduced to any other scale assigned, by substituting instead of the root in one scale, what is equivalent to it expressed by the root of the other scale. Thus to reduce sexagenary numbers to decimals, because 60 or X is $= 6 \times 10$, or $X = 6x$, therefore $X^2 = 6^2 x^2 = 36x^2$, $X^3 = 6^3 x^3 = 216x^3$, &c. By the substitution of these we shall easily find the equivalent number in the decimal scale. All vulgar fractions and mixed numbers are, in some measure, the expressions of number by a particular scale; or making the denominator of the fraction to be the root of a new scale: thus $\frac{3}{5}$ is in effect $0 \times 3^0 + 2 \times 3^{-1}$, and $8\frac{3}{5}$ is the same as $8 \times 5^0 + 3 \times 5^{-1}$, and so of others.

For more on this subject see Hutton's Montucla, vol. i. and Barlow's Theory of Numbers.

SCALE, a mathematical instrument, consisting of several lines drawn on wood, brass, silver, &c. and variously divided, according to the purposes it is intended to serve; whence it acquires various denominations, as the plain scale, diagonal scale, plotting scale, Gunter's scale, &c. See MATHEMATICAL INSTRUMENTS.

SCALE (Diagonal), is projected thus: first draw eleven parallel lines at equal distances, the whole length of which being divided into a certain number of equal parts, according to the length of the scale, by perpendicular parallels, let the first division be again subdivided into ten equal parts, both above and below; then drawing the oblique lines from the first perpendicular below to the first subdivision above, and from the first subdivision below to the second subdivision above, &c. the first space shall thereby be exactly divided into one hundred equal parts; for as each of these subdivisions is one tenth part of the whole first space or division, so each parallel above it is one tenth of such subdivision, and consequently one hundredth part of the whole first space; and if there be ten of the larger divisions, one thousandth part of the whole scale. If therefore the larger divisions be accounted units, the first subdivisions will be tenth parts of an unit; and the second subdivisions, marked by the diagonals on the parallels, hundredth parts of an unit. Again, if the larger divisions be reckoned tens, the first subdivisions will be units, and the second subdivisions tenth parts: and if the larger divisions be accounted hundredths, the first subdivisions will be tens, and the second units: and so on.

SCALE (Gunter's), an instrument, so called from Mr. Gunter, its inventor, is generally made of box: there are two sorts, the long Gunter and the sliding Gunter, having both the same lines, but differently used, the former with the compasses, the latter by sliding. The lines now generally delineated on those instruments are the following, viz. a line of numbers, of sines, tangents, versed sines, sine of the rhumb, tangent of the rhumb, meridional parts, and equal parts; which are constructed after the following manner:

The line of numbers is no other than the logarithmic scale of proportionals, wherein the distance between each division is equal to the number of mean proportionals contained between the two terms, in such parts as the distance between 1 and 10 is 1000, &c. equal the logarithm of that number. Hence it follows, that if the number of equal parts expressed by the logarithm of any number be taken from the same scale of equal parts, and set off from 1 on the line of numbers, the division will represent the number answering to that logarithm. Thus, if you take .954, &c. (the logarithms of 9) of the same parts, and set it off from 1 towards 10, you will have the division standing against the number 9. In like manner, if you set off .903, &c. .845, &c. .778, &c. (the logarithms of 8, 7, 6) of the same equal parts from 1 towards 10, you will have the divisions answering to the numbers 8, 7, 6. After the same manner may the whole line be constructed.

The line of numbers being thus constructed, if the numbers answering to the natural sines and tangents of any arch, in such parts as the radius is 10,000, &c. be found upon the line of numbers, right against them will stand the respective divisions answering to the respective arches, or which is the same thing, if the distance between the centre and that division of the line of numbers, which expresses the number answering to the natural sine or tangent of any arch, be set off on its respective line from its centre towards the left hand, it will give the point answering to the sine or tangent of that arch; thus the natural sine of 30 degrees being 5000, &c. if the distance between the centre of the line of numbers (which in this case is equal to 10,000, &c. equal the radius) and the division, on the same line representing 5000, &c. be set off from the centre, or 90 degrees, on the line of sines, towards the left hand, it will give the point answering to the

sine of 30 degrees. And after the same manner may the whole line of sines, tangents, and versed sines be divided.

The line of sines, tangents, and versed sines being thus constructed, the line sine of the rhumb, and tangent of the rhumb are easily divided; for if the degrees and minutes answering to the angle which every rhumb makes with the meridian be transferred from its respective line to that which is to be divided, we shall have the several points required; thus if the distance between the radius or centre, and sine of 45 degrees equals the fourth rhumb, be set off upon the line sine of the rhumb, we shall have the point answering to the sine of the fourth rhumb; and after the same manner may both these lines be constructed. The line of meridional parts is constructed from the table of meridional parts, in the same manner as the line of numbers is from the logarithms.

The lines being thus constructed, all problems relating to arithmetic, trigonometry, and their depending sciences, may be solved by the extent of the compasses only; and, as all questions are reducible to proportions, the general rule is, to extend the compasses from the first term to the second, and the same extent of the compasses will reach from the third to the fourth; which fourth term must be so continued as to be the thing required, which a little practice will render easy.

SCALE, in architecture and geography, a line divided into equal parts, placed at the bottom of a map or draught, to serve as a common measure to all the parts of the building, or all the distances and places of the map.

In maps of large tracts, as kingdoms and provinces, &c. the scale usually consists of miles; whence it is denominated a scale of miles.—In more particular maps, as those of manors, &c. the scale is usually of chains, &c. —The scales used in draughts of buildings mostly consist of modules, feet, inches, palms, fathoms, or the like.

To find the distance between two towns, &c. in a map, the interval is taken in the compasses, and set off in the scale; and the number of divisions it includes gives the distance. The same method serves to find the height of a story, or other part in a design.

SCALE (Front), in perspective, is a right line in the draught, parallel to the horizontal line; divided into equal parts, representing feet, inches, &c.

SCALE (Flying), is a right line in the draught, tending to the point of view, and divided into unequal parts, representing feet, inches, &c.

SCALE (Differential). See SERIES and DIFFERENTIAL.

SCALE OF RELATION, in algebra, an expression denoting the relation of the terms of recurring series to each other. See SERIES.

SCALE, in music, is a denomination given to the arrangement of the six syllables, invented by Guido Aretino, *ut re mi fa sol la*; called also gammut. It is called scale, or ladder, because it represents a kind of ladder, by means of which the voice rises to acute, or sinks to grave; each of the six syllables being as it were one step of the ladder.

Scale is also used for a series of sounds rising or falling towards acuteness or gravity, from any given pitch of tune, to the greatest distance that is fit or practicable, through such intermediate degrees as to make the succession most agreeable and perfect, and in which we have all the harmonical intervals most commodiously divided.

The scale is otherwise called an universal system, as including all the particular systems belonging to music. See SYSTEM.

There were three different scales in use among the ancients, which had their denominations from the three several sorts of music, viz. the diatonic, chromatic, and inharmonic. See MUSIC.

It is not any order or progression of musical degrees or intervals that will produce melody; thus, a number of greater tones will make no music, because no number of them is equal to any concord; and the same is true of the other degrees. There is a necessity, therefore, to mix the degrees to make music; and the mixture must be such that no two of the same kind are ever placed next to each other.

A natural and agreeable order of these degrees Mr. Malcolm gives in the following division of the interval of an octave, wherein (as all the lesser concords are contained in the greater) the divisions of all the other simple concords are contained. Under the series are the degrees between each term, and the next. In the first series, the progression is by the greater third, in the latter by the less third.

great	2d	gr.	3d	4th	5th	6th	7th	8th
1 :	$\frac{8}{9}$:		$\frac{4}{5}$:	$\frac{3}{4}$:	$\frac{2}{3}$:	$\frac{3}{5}$:	$\frac{8}{15}$:	$\frac{1}{2}$
Key or fund.	great tone.		less tone.	semi-tone.	great tone.	less tone.	great tone.	semi-tone.

great second.							
1 :	$\frac{8}{9}$:	$\frac{5}{6}$:	$\frac{3}{4}$:	$\frac{2}{3}$:	$\frac{5}{8}$:	$\frac{5}{9}$:	$\frac{1}{2}$
key or fund.	great tone.	semi-tone.	less tone.	great tone.	semi-tone.	great tone.	less tone.

Now, the system of the octave containing all the original concords; and the compound concords being only the sums of octave, and some less concord; it is evident, that if we would have the series of degrees continued beyond octave, they are to be continued in the same order through a second as through the first octave, and so on through a third or fourth

octave, &c. and such a series is what we call the scale of music.

Of this there are two different species, according as the less or greater 3d, or the less or greater 6th, are taken in; for both can never stand together in relation to the same key or fundamental, so as to make an harmonical scale. But if, by either of these ways, we ascend from a fundamental or given sound, to an octave, the succession will be melodious, though the two make two different species of melody. Indeed, every note is discord with regard to the next, but each of them is concord to the fundamental, except the 2d and 7th.

In continuing the series, there are two ways of compounding the names of the simple interval with the octave: thus, a greater or less tone or semi-tone above an octave, or two octaves, &c. or to call them by the number of degrees from the fundamental, as 9th, 10th, &c.

In the two scales above, the several terms of the scale are expressed by the proportionable sections of a line, represented by 1, the key or fundamental of the series. If we would have the series expressed in the whole numbers, they will stand as follows, in each whereof the greatest number expresses the longest chord, and the other numbers the rest in order; so that if any number of chords be in these proportions of length, they will express the true degrees and intervals of the scale of music, as contained in an octave concinnously divided in the two different species above mentioned.

540 :	480 :	432 :	405 :	360 :	324 :	288 :	270
great tone.	less tone.	semi-tone.	great tone.	less tone.	great tone.	semi-tone.	

216 :	192 :	180 :	162 :	144 :	135 :	120 :	108
great tone.	semi-tone.	less tone.	great tone.	semi-tone.	great tone.	less tone.	

This scale the ancients called the diatonic scale, because proceeding by tones and semitones.

The moderns call it, simply, the scale, as being the only one now in use; and sometimes, the natural scale, because its degrees, and their order, are the most agreeable and concinnous, and are preferable, by the consent both of sense and reason, to all other divisions ever instituted. Those others, are the chromatic and enharmonic scales, which, with diatonic, made the three scales or genera of melody of the ancients.

Many have been the disputes among ancient and modern musicians, about the constitution of musical scales. Some of the ancients, with Euclid, will have it composed of tones major and limmas, so that the seven intervals of an octave would be thus expressed $\frac{9}{8}, \frac{256}{243}, \frac{9}{8}, \frac{9}{8}, \frac{256}{243}, \frac{9}{8}, \frac{9}{8}$. Some modern authors have from hence inferred the imperfection of the Greek music. They allege, we here find the diatonus, or an interval equal to two tones major expressed by $\frac{81}{64}$, instead of the true third major expressed by $\frac{5}{4}$. As there can be no question of the beauty and elegance of the latter, the former therefore must be out of tune by a whole comma, which is very shocking to the ear. In like manner, the trihemitone of the ancients falls short of the third minor by a comma; which is also the deficiency of their hemitone, or limma, from the true semi-tone major, so essential to good melody. All which errors would make their scale appear much out of tune to us. A late learned author (Dr. Pepusch, Philosophical Transactions, N° 48,) says he readily grants the objection, but adds, that such a scale also appeared out of tune to the ancients themselves, since they expressly tell us, that the intervals less than the diatessaron, or fourth, as also the intervals between the fifth and octave, were dissonant, and disagreeable to the ear. Their scale here mentioned, and called by some scala maxima, was not intended to form the voice to sing accurately, but was designed to represent the system of their modes and tones, and give the true fourths and fifths of every key a composer might choose. Now if, instead of tones major and limmas, we take the tones major and minor, with the semi-tone major, as the moderns contend we should, we shall have a good scale indeed, but a scale adapted only to the concinnous constitution of one key; and whenever we proceed from that into another, we find some fourth or fifth erroneous by a comma. This the ancients did not admit of. If to diminish such errors, we introduce a temperature, we shall have nothing in tune but the octave; so that this scale of the ancients was not destitute of reason, and no good argument against the accuracy of their practice can from thence be formed.

The design of the scale of music is, to shew how a voice may rise and fall less than any harmonical interval, and thereby move from the one extreme of any interval to the other, in the most agreeable succession of sounds. The scale, therefore, is a system exhibiting the whole principles of music, which are either harmonical intervals (commonly called concords), or concinnous intervals; the first are the essential principles, the others are subservient to them, to make the greater variety.

Accordingly, in the scale, we have all the concords, with their concinnous degrees, so placed, as to make the most perfect succession of sounds from any given fundamental or key, which is supposed to be represented by 1. It is not to be supposed, that the voice is never to move up and down by any other more immediate distances than those of the concinnous degrees; for though that be the most usual movement, yet to move by harmonical distances, as concords, at once, is not excluded, but is even absolutely necessary. In reality, the degrees were only invented for variety sake,

and that we might not always move up and down by harmonic intervals, though those are the most perfect, the others deriving all their agreeableness from their subserviency to them.

Add that, besides the harmonical and concinnous intervals, which are the immediate principles of music, and are directly applied in practice; there are other discord relations, which happen unavoidably in music, in a kind of accidental and indirect manner; for, in the succession of the several notes of the scale, there are to be considered not only the relations of those that succeed others immediately, but also of those betwixt which other notes intervene. Now the immediate succession may be conducted so as to produce good melody, and yet among the distant notes there may be very gross discords, that would not be allowed in immediate succession much less in consonance. Thus in the first series, or scale above delivered, though the progression be melodious, as the terms refer to one common fundamental; yet are there several discords among the mutual relations of the terms; *e. gr.* from 4th to 7th is 32 : 45; and from the greater 2d to the greater 6th is 27 : 40; and from the greater 2d to 4th is 27 : 32, which are all discords; and the same will happen in the second series.

It will be seen that the scale supposes no determinate pitch of tune; but that being assigned to any key, it marks out the tune of all the rest with relation to it; it also shews what notes can be naturally joined to any key, and thereby teaches the just and natural limitations of melody; and when the song is carried through several keys, yet it is still the same natural scale, only applied to different fundamentals. If a series of sounds be fixed to the relations of the scale, it will be found exceedingly defective, but this imperfection is not any defect in the scale, but follows accidentally from its being confined to this condition, which is foreign to the nature and office of the scale of music.

This is the case in musical instruments, and in this consists their great deficiency; for, suppose a series of sounds, as those of an organ or harpsichord, fixed in the order of this scale, and the lowest taken at any pitch of tune, it is evident, 1. That we can proceed from any note, only by one particular order of degrees; since from every note of the scale to its octave, is contained a different order of the tones and semitones. Hence, 2. we cannot find any interval required from any note upwards or downwards, since the intervals from every note to every other are also limited. And hence, 3. a song may be contrived, that beginning at a particular note of the instrument, all the intervals, or other notes, shall be found exactly on the instrument, or in the fixed series; yet, were the song, though perfectly diatonic, begun in any other note, it could not proceed.

In effect, it is demonstrable, that there can be no such thing as a perfect scale fixed on instruments, i. e. no such scale, as, from any note upwards or downwards, shall contain any harmonical or concinnous interval required.

The only remedy for this defect of instruments whose notes are fixed, must be by inserting other notes and degrees betwixt those of the diatonic series. Hence some authors speak of dividing the octave into 16, 18, 20, 24, 26, 31, and other number of degrees; but it is easy to conceive, how hard it must be to perform on such an instrument.

The best of it is, we have a remedy on easier terms; for a scale proceeding by twelve degrees, that is, thirteen notes, including the extremes, to an octave, renders our instruments so perfect, that we have little reason to complain. This, then, is the present scale for instruments, viz. between the extremes of every tone of the natural scale is put a note, which divides it into two unequal parts, called semitones, whence the whole may be called the semitonic scale, as containing twelve semitones betwixt thirteen notes within the compass of an octave.

And to preserve the diatonic series distinct, these inserted notes take either the name of the natural tone next below, with the mark ♯ called a sharp, or the name of the natural note next above, with this mark ♭ called a flat. See KEY and MUSIC.

SCA'LED. *a.* (from *scale.*) Squamous; having scales like fishes (*Shakspeare*).

SCALENE, or SCALENOUS TRIANGLE, is a triangle whose sides and angles are all unequal.—A cylinder or cone, whose axis is oblique or inclined to its base, is also said to be scalenous: though more frequently it is called oblique.

SCALENI MUSCULI. (*scalenus*, from σκαληνος, irregular or unequal.) Anatomical writers have differed greatly in their descriptions of these muscles, which are situated on the side of the neck, between the transverse processes of the cervical vertebræ and the upper part of the thorax. The ancients, who gave it its name from its resemblance to an irregular triangle, considered it as one muscle. Vesalius and Winslow divide it into two; Fallopius and Cowper into three; Douglas into four, and Albinus into five portions, which they describe as distinct muscles. Without deviating in the least from anatomical accuracy, it may be considered as one muscle, divided into three portions. The anterior portion arises commonly from the transverse processes of the six inferior vertebræ of the neck, by as many short tendons, and descending obliquely outwards, is inserted tendinous and fleshy, into the upper side of the first rib, near its cartilage. The axillary artery passes through this portion, and sometimes divides it into two slips, about an inch and a half above its insertion. The middle portion arises by distinct tendons, from the transverse processes of the four last vertebræ of the neck, and descending obliquely outwards and a little backwards, is inserted tendinous into the outer and upper part of the first rib, from its root to within the distance of an inch from its cartilage. The space between this and the anterior portion affords a passage to the nerves going to the upper extremities. It is in part covered

by the third or posterior portion, which is the thinnest and longest of the three. This arises from the transverse processes of the second, third, fourth, and fifth vertebræ of the neck, by distinct tendons, and is inserted into the upper edge of the second rib, at the distance of about an inch and a half from its articulation, by a broad flat tendon. The use of the scalenus is to move the neck to one side, when it acts singly, or to bend it forwards, when both muscles act; and when the neck is fixed, it serves to elevate the ribs and dilate the chest.

SCALENUS PRIMUS. See SCALENI MUSCULI.

SCALENUS SECUNDUS. See SCALENI MUSCULI.

SCALENUS TERTIUS. See SCALENI MUSCULI.

SCALIGER (Julius Cæsar), a profound scholar, born in 1484, at the castle of Ripa, in the territory of Verona. Various accounts are given of his first setting out in life; but whatever was his first employment, he carried arms very young, and was chosen by the emperor Maximilian to be one of his pages. He afterwards acquired great reputation in the belles lettres and in the sciences. He studied and practised physic at Agen, where at the age of 42 he married a young lady, by whom he had 15 children. He lived by the profession of medicine, but his main pursuit was learning. He made himself master of Greek, French, German, Italian, and Sclavonic, and though he did not publish any work till he was 47, yet he soon established a high reputation in the republic of letters. He died of a dysury, in 1558, leaving many works behind him.

SCALIGER (Joseph Justus), a celebrated French chronologer and critic, was the son of Julius Cæsar Scaliger, and born at Agen in France, in 1540. He studied in the college of Bourdeaux; after which his father took him under his own care, and employed him in transcribing his poems; by which means he obtained such a taste for poetry, that before he was 17 years old, he wrote a tragedy upon the subject of Oedipus, in which he introduced all the poetical ornaments of style and sentiment.

His father dying in 1558, he went to Paris the year following, with a design to apply himself to the Greek tongue. For this purpose he for two months attended the lectures of Turnebus; but finding that in the usual course he should be a long time in gaining his point, he shut himself up in his closet, and by constant application for two years gained a perfect knowledge of the Greek language. After which he applied himself to the Hebrew, which he learned by himself with great facility. And in like manner he ran through many other languages, till he could speak it is said no less than 13 ancient and modern ones. He made no less progress in the sciences; and his writings procured him the reputation of one of the greatest men of that or any other age. He embraced the reformed religion at 22 years of age. In 1563, he attached himself to Lewis Casteignier de la Roch Pazay, whom he attended in several journeys. And, in 1593, the curators of the university of Leyden invited him to an honorary professorship in that university, where he lived 16 years, and where he died of a dropsy in 1609, at 69 years of age.

Scaliger was a man of great temperance; was never married; and was so close a student, that he often spent whole days in his study without eating: and though his circumstances were always very narrow, he constantly refused the presents that were offered him.

He was author of many ingenious works on various subjects. His elaborate work, De Emendatione Temporum; his exquisite animadversions on Eusebius; with his Canon Isagogicus Chronologiæ; and his accurate comment upon Manilius's Astronomicon, sufficiently evince his knowledge in the astronomy, and other branches of learning, among the Ancients, and who, according to the opinion of the celebrated Vieta, was far superior to any of that age. And he had no less a character given him by the learned Casaubon. He wrote Cyclometrica et Diatriba de Equinoctiorum Anticipatione. He wrote also notes upon Seneca, Varro, and Ausonius's Poems. But that which above all things renders the name of Scaliger memorable to posterity, is the invention of the Julian period, which consists of 7980 years, being the continued product of the three cycles, of the sun 28, the moon 19, and Roman indiction 15. This period had its beginning fixed to the 764th year before the creation, and is not yet completed, and comprehends all other cycles, periods, and epochas, with the times of all memorable actions and histories.—The collections intitled Scaligeriana were collected from his conversations by one of his friends; and being ranged in alphabetical order, were published by Isaac Vossius.

SCA'LINESS. *s.* (from *scaly*.) The state of being scaly.

SCALL. *s.* (*skalladur*, bald, Islandic.) Leprosy; morbid baldness (*Leviticus*).

SCALLION, in botany. See ALLIUM.

SCALLOP, in ichthyology. See PECTEN.

To SCA'LLOP. *v. a.* To mark on the edge with segments of circles.

SCALP. *s.* (*schelp*, Dutch.) 1. The scull; the cranium; the bone that encloses the brain (*Sharp*). 2. The integuments of the head (*Phillips*).

To SCALP. *v. a.* (from the noun.) To deprive the scull of its integuments (*Sharp*).

SCA'LPEL. *s.* (French; *scalpellum*, Lat.) An instrument used to scrape a bone.

SCA'LY. *a.* (from *scale*). Covered with scales (*Milton*).

SCALY, in botany. Squamosus. A scaly root or bulb: composed of scales lying over each other; as in the lily.—A scaly stem or pedunclè: having scales scattered over it.

SCAMANDER, or SCAMANDROS, a celebrated river of Troas, rising at the east of mount Ida, and falling into the sea below Sigæum. It receives the Simois in its course. This river, according to Homer, was called Xanthus by the gods, and Scamander by men.—2. A son

of Corybas and Demodice, who brought a colony from Crete into Phrygia, and settled at the foot of mount Ida, where he introduced the festivals of Cybele, and the dances of the Corybantes. He some time after lost the use of his senses, and threw himself into the river Xanthus, which ever after bore his name. His son-in-law Teucer succeeded him in the government of the colony.

To SCA'MBLE. *v. n.* 1. To be turbulent and rapacious; to scramble; to get by struggling with others (*Wotton*). 2. To shift awkwardly.

To SCA'MBLE. *v. a.* To mangle; to maul (*Mortimer*).

SCA'MBLER. *s.* (Scottish.) A bold intruder upon one's generosity or table.

SCA'MBLINGLY. *ad.* (from *scambling*.) With turbulence and noise; with intrusive audaciousness.

SCAMMO'NIATE. *a.* (from *scammony*.) Made with scammony (*Wiseman*).

SCAMMONIUM. (σκαμμωνια; a corruption of the Arabian word *chamozah*.) Scammony. The concrete gummi-resinous juice of the convolvulus scammonia; foliis sagitatis postice truncatis, pedunculis teretibus subtifloris of Linnéus. C. O. Pentandria. Monogynia. It is from the milky juice of the root that we obtain the officinal scammony, which is procured in the following manner by the peasants who collect it in the beginning of June: having cleared away the earth from about the root, they cut off the top in an oblique direction, about two inches below where the stalks spring from it. Under the most depending part of the slope they fix a shell, or some other convenient receptacle, into which the milky juice gradually flows. It is left there about twelve hours, which time is sufficient for draining off the whole juice; this, however, is in small quantity, each root affording but a very few drachms. This juice from the several roots is put together, often into a leg of an old boot for want of some more proper vesssel, where in a little time it grows hard, and is the genuine scammony. It is brought from Aleppo and Smyrna in masses, generally of a light shining gray colour, and friable texture; of rather an unpleasant smell, and bitterish and slightly acrid taste. The scammony of Aleppo is by far the purest. That of Smyrna is ponderous, black, and mixed with extraneous matters. Scammony appears to have been well known to the Greek and Arabian physicians, and was exhibited internally as a purgative, and externally for the itch, tinea, fixed pains, &c. It is seldom given alone, but enters several compounds, which are administered as purgatives.

When Aleppo scammony is pure, it melts readily on a heated plate of iron, and emits fumes of a nauseating smell. Triturated with water it renders it milky. With boiling water it concretes into a lump: the water becomes yellow, and has a bitter taste, but it is neither alkaline nor acid; which proves, that this substance is not adulterated with ashes, as some authors affirm.

Alcohol at 40° (sp. grav. 0 817) produces a slight precipitate in this aqueous solution; and the acetate of lead occasions a yellow flocculent precipitate soluble in nitric acid.

The alcoholic tincture of scammony has a brownish yellow colour. It reddens tincture of litmus; and leaves on evaporation a yellowish white and transparent resin.

This resin dissolves entirely in nitric acid, which it colours yellow. The addition of water renders this solution slightly turbid.

It is equally soluble in a solution of pure potash, even without heat, when its colour is yellow; but if heat be employed, it is brown. Water, even in pretty large quantities, does not precipitate any of the resin. If the solution be saturated with muriatic acid, the resin does not separate. This triple compound of resin, acid, and potash, claims the notice of practitioners: perhaps we may thus discover a solvent for resins, that water would not render turbid.

The part of the scammony that was not soluble in alcohol assumed a gray colour when dry. Treated with boiling water it coloured it yellow, and alcohol occasioned a white flocculent precipitate in it.

To determine the proportion of the constituent principles of Aleppo scammony, we took 100 parts of this substance, and exhausted them by alcohol. The solution was yellow. A gray substance remained, which, when dried, weighed 26.

The alcoholic solution was evaporated to a sirupy consistence. Cold water precipitated from it a resin, which formed a homogeneous mass. The supernatant liquor was clear and colourless. Evaporated to dryness a brown matter was obtained, soluble both in water and in alcohol, and precipitable by acetate of lead. This substance appeared to be what is called extract. When dried it weighed 2 parts.

The resinous mass, separated and dried, was yellow, and weighed 60.

The 26 parts insoluble in alcohol were then treated with boiling water. After evaporation a glutinous matter remained, weighing 3 parts, and having all the characters of gum. The remainder consisted of fibres of vegetables and a little silex.

The distillation of Aleppo scammony exhibited nothing remarkable. Its products were a very acid brown liquor, and a light, blackish oil. The coal was black, shining, and compact. It contained the carbonats of potash and lime, alumine, silex, and a little iron.

The fusion of Smyrna scammony is less complete than that of Aleppo. Instead of concreting into a lump with boiling water, it becomes clotty; but the water poured off has similar qualities.

An equal portion of this scammony, exhausted by boiling alcohol, afforded a tincture of a deeper colour, though containing less resin. By evaporation a brownish, transparent resin was obtained, weighing 28 parts. The matter insoluble in alcohol weighed 66. This residuum, treated with boiling water, coloured it yellow. The solution had a faint sweetish taste; and alcohol produced in it a flocculent

precipitate soluble in water. On evaporation it left a thick glutinous matter resembling mucilage, soluble with heat in weak nitric acid, and letting fall on cooling a white pulverulent substance, that had all the characters of mucous acid.

In this experiment water took up only 8 parts of the matter insoluble in alcohol. The remainder was subjected to the action of nitric acid assisted by heat, which dissolved it with effervescence. Ammonia added to this solution threw down a precipitate soluble in potash. Potash and oxalat of ammonia too occasioned a precipitate. This residuum therefore, beside vegetable fibres and the substance insoluble in water and alcohol, which appeared to be oxigenized extract, was composed of alumine and carbonat of lime.

This substance, being incinerated, left a whitish powder, soluble in great part with effervescence in muriat acid. This solution contained alumine, lime, and a little iron. The portion not soluble in muriatic acid, being treated with potash, yielded a siliceous precipitate on the addition of an acid.

The water employed to precipitate the resin left after evaporation a brown matter, weighing 5 parts, of a bitter taste, attracting the moisture of the atmosphere, soluble in alcohol, and copiously precipitated from its aqueous solution by acetate of lead. This substance exhibited all the properties of extract.

From this analytical essay therefore it follows, that Aleppo scammony is composed of

Resin - - - - -	60
Gum - - - - -	3
Extract - - - - -	2
Vegetable fibres, earthy matter, &c.	35
	100

and that Smyrna scammony contains

Resin - - -	29
Gum - - -	8
Extract - -	5
Vegetable fibres, &c.	58
	100

SCAMMONY. See SCAMMONIUM.

To SCA'MPER. *v. n.* (*schampen*, Dutch; *scampare*, Italian.) To fly with speed and trepidation (*Addison*).

To SCAN. *v. a.* (*scando*, Lat.) 1. To examine a verse by counting the feet (*Walsh*). 2. To examine nicely (*Calamy*).

SCA'NDAL. *s.* (σκανδαλον.) 1. Offence given by the faults of others (*Milton*). 2. Reproachful aspersion; opprobrious censure; infamy (*Rogers*).

To SCA'NDAL. *v. a.* (from the noun.) To treat opprobriously; to charge falsely with faults (*Shakspeare*).

To SCA'NDALIZE. *v. a.* (σκανδαλιζω). 1. To offend by some action supposed criminal (*Clarendon*). 2. To reproach; to disgrace; to defame (*Daniel*).

SCA'NDALOUS. *a.* (*scandaleux*, French.) 1. Giving public offence (*Hooker*). 2. Opprobrious; disgraceful. 3. Shameful; openly vile (*Pope*).

SCA'NDALOUSLY. *ad.* 1. Shamefully; ill to a degree that gives public offence (*Swift*). 2. Censoriously; opprobriously (*Pope*).

SCA'NDALOUSNESS. *s.* (from *scandalous*.) The quality of giving public offence.

SCANDALUM MAGNATUM, is the special name of a statute, and also of a wrong done to any high personage of the land, as prelates, dukes, marquises, earls, barons, and other nobles; and also the chancellor, treasurer, clerk of the privy seal, steward of the house, justice of one bench or other, and other great officers of the realm, by false news, or horrible or false messages, whereby debates and discord, betwixt them and the commons, or any scandal to their persons might arise. 2 R. II. c. 5. This statute has given name to a writ, granted to recover damages thereupon. Cowel.—It is now clearly agreed, that though there are no express words in the statute which gave an action, yet the party injured may maintain one on this principle of law; that when a statute prohibits the doing of a thing, which, if done, might be prejudicial to another, in such a case he may have an action on that very statute for his damage. 2 Mod. 152.

SCANDENT STEM, in botany. A climbing stem. Alta petens, aliis sustinendus. Weak, and requiring support in mounting; the clasper or tendril is usually the agent; as in the everlasting pea, and many other leguminous plants. It is different from volubile stem, which mounts by twining.

SCANDERBEG, or George Castriot, king of Albania, a province dependant on the grand seignior, was born in 1404, and delivered by his father John Castriot, with his three brothers, as hostages to the sultan, Amurath II. who poisoned the rest, but spared him on account of his youth. Amurath caused him to be circumcised, and gave him the command of some troops, with the title of sangiak. On hearing of the death of his father in 1432, he formed the design of recovering the throne of his ancestors, and establishing the independence of his country. Being some time after sent against the Hungarians he revolted and joined Huniade Corvinus, and having seized the sultan's secretary, he made him sign an order as from his master to the governor of Croia, the capital of Albania, to deliver up to him that place, whither he repaired, and succeeded. Thus having recovered his inheritance he bade defiance to the whole Ottoman power, and defeated all the armies which were sent against him. At length the sultan Mahomet II. was glad to make peace in 1461. This renowned hero died full of glory six years afterwards; and on hearing of this event Mahomet exclaimed, in a fit of joy, "What can hinder me from finishing the destruction of the Christians now they have lost their sword and their shield?"

SCANDEROON. See ALEXANDRETTA.

SCANDINAVIA, a name given by the ancients to the tract of territory which contains

the modern kingdoms of Norway, Sweden, Denmark, &c.

SCANDIX. Cicely. Chervil. Shepherd's needle. Venus's comb. In botany, a genus of the class pentandria, order digynia. Fruit subulate; corol radiate; petals emarginate; central florets often male. Ten species, scattered over the globe; three indigenous to our own hedges and corn-fields. The following are chiefly worth noticing:

1. S. odorata. Sweet cicely. Seeds grooved, angular; root thick, perennial; leaves fern-like; whence it is sometimes called sweet fern. Found wild in our hedges.

2. S. pecten. Seeds with a very long beak; leaflets in many linear segments. It is to this species that the name Venus's comb, or shepherd's needle, is given peculiarly. It is a corn-field flower of our own country, and of other parts of Europe.

3. S. cerefolium. Garden chervil. Seeds shining, ovate-subulate: umbels sessile, lateral; root annual; flowers white. A native of the Levant, formerly much more cultivated than at present. It is used as a culinary plant in winter and spring.

SCANNING, in poetry, the measuring of verse by feet, in order to see whether or not the quantities be duly observed.—The term is chiefly used in Greek and Latin verses. Thus, an hexameter verse is scanned by resolving it into six feet; a pentameter, by resolving it into five feet, &c.

SCA'NSION. *s.* (*scansio*, Latin.) The act or practise of scanning a verse.

SCANSORIAL, formed for climbing: applied to the feet of birds which have two toes before, and two behind; all divided to the base.

To SCANT. *v. a.* (gescænan, Saxon.) To limit; to straiten (*Glanville*).

SCANT. *a.* (from the verb.) 1. Not plentiful; scarce; less than what is proper or competent (*Milton*). 2. Wary; not liberal; parsimonious (*Shakspeare*).

SCANT. *ad.* (from the adjective). Scarcely; hardly: obsolete (*Camden*).

SCA'NTILY. *ad.* (from *scanty*). 1. Narrowly, not plentifully. 2. Sparingly; niggardly (*Shakspeare*).

SCA'NTINESS. *s.* (from *scanty*.) 1. Narrowness; want of space; want of compass (*Dryden*). 2. Want of amplitude or greatness; want of liberality (*South*).

SCA'NTLET. *s.* A small pattern; a small quantity; a little piece (*Hale*).

SCA'NTLING. *s.* (*eschantillon*, Fr.) 1. A quantity cut for a particular purpose (*L'Estrange*). 2. A certain proportion (*Shaks.*). 3. A small quantity (*Taylor*). The term is most frequently applied to the dimensions of any piece of timber, with regard to its breadth and thickness.

SCA'NTLY. *ad.* (from *scant*.) 1. Scarcely; hardly: obsolete (*Camden*). 2. Narrowly; penuriously; without amplitude (*Dryden*).

SCA'NTNESS. *s.* (from *scant*). Narrowness; meanness; smallness (*Hayward*).

SCA'NTY. *a.* (the same with *scant*). 1. Narrow; small; wanting amplitude; short of quantity sufficient (*Locke*). 2. Small; poor; not copious; not ample (*Locke*). 3. Sparing; niggardly; parsimonious (*Watts*).

To SCAPE. *v. a.* (contracted from *escape*.) To escape; to miss; to avoid; to shun; not to incur; to fly (*Milton*).

To SCAPE. *v. n.* To get away from hurt or danger (*Dryden*).

SCAPE. *s.* (from the verb.) 1. Escape; flight from hurt or danger; accident of safety (*Shakspeare*). 2. Means of escape; evasion (*Donne*). 3. Negligent freak; deviation from regularity (*Shakspeare*). 4. Loose act of vice or lewdness (*Milton*).

SCAPE, in botany. (*scapus*, from σκηπτω, to lean upon; whence σκηπων, σκηπανιον, and σκηπτρον, and the Latin *scipio*, for a staff; and *scapus*, the shaft of a column, and the straight stalk of an herb resembling it.) According to Linnæus—truncus elevans fructificationem, nec folia. A stem bearing the fructification, without leaves: as in narcissus, pyrola, hyacinthus, &c. Peduncle would with more propriety be rendered flower-stalk than this.

SCAPE-GOAT, in the Jewish antiquities, the goat which was set at liberty on the day of solemn expiation. For the ceremonies on this occasion, see Levit. xvi. 5, 6, &c. Some say, that a piece of scarlet cloth, in form of a tongue, was tied on the forehead of the scape goat. Hoff. Lex. Univ. in voc. Lingua.

Many have been the disputes among the interpreters concerning the meaning of the word scape-goat; or rather of azazel, for which scape-goat is put in our version of the Bible. Spencer is of opinion, that azazel is a proper name, signifying the devil or evil dæmon. See his reasons in his book De leg. Hebr. ritual. dissert. viii. Among other things, he observes, that the ancient Jews used to substitute the name Samaël for Azazel; and many of them have ventured to affirm, that at the feast of expiation they were obliged to offer a gift to Samaël to obtain his favour. Thus also the goat, sent into the wilderness to Azazel, was understood to be a gift or oblation. Some Christians have been of the same opinion. But Spencer thinks that the genuine reasons of the ceremony were, 1. That the goat, loaded with the sins of the people, and sent to Azazel, might be a symbolical representation of the miserable condition of sinners. 2. God sent the goat thus loaded to the evil dæmons, to show that they were impure, thereby to deter the people from any conversation or familiarity with them. 3. That the goat sent to Azazel sufficiently expiating all evils, the Israelites might the more willingly abstain from the expiatory sacrifices of the Gentiles.

Le Clerc is of opinion that Azazel was the name of a place, either a mountain or cliff, to which the goat was led, and from thence, as the rabbis say, it was cast down and killed; but no such place has been specified, except a mountain near Mount Sinai, mentioned by an anonymous writer of very little credit,

which must have been too far distant for the scape-goat to have been conducted thither from Jerusalem.

The most common opinion is, that azazel is a name given to the goat itself, on account of his being let go, as being derived from עז *gnez* or *az*, goat, and שלח *azel*, he hath gone away. Thus it was understood by our translators, who render it scape-goat; the Septuagint likewise render it αποπομπαιος, and the Vulgate *emissarius*. Those who adopt this opinion observe, that as the sacrifice-goat was typical of the expiation of sin by the sacrifice of Christ, the scape-goat, which was to have the sins of the people confessed over him, and as it were put upon him, and then to be sent away alive into some desart place, where they would see him no more, was intended to signify the effect of the expiation, namely the removing of guilt, insomuch that it should never more be charged on the once pardoned sinner.

SCAPEMENT, from the French word *echappement*, a term used among clock and watchmakers, to denote the general contrivance by which the pressure of the wheels, (which move always in one direction) and the reciprocating motion of the pendulum or balance are accommodated the one to the other. When a tooth of a wheel has given the balance or pendulum a motion in one direction, it must quit it, that it may get an impulsion in the opposite direction; and it is this escaping of the tooth of the wheel from the balance or pendulum, or of the latter from the former, whichever we please to call it, that has given rise to the general term.

From the nature of a pendulum it follows that it need only be removed from the vertical position, and then let go in order to vibrate and measure time. Hence it might seem, that nothing is wanted but a machinery so connected with the pendulum as to keep a register, as it were, of the vibration. It could not be difficult to contrive a method of doing this; but more is wanted, the air must be displaced by the pendulum. This requires some force, and must therefore employ some part of the momentum of the pendulum. The pivot on which it swings occasions friction—the thread, or thin piece of metal by which it is hung, in order to avoid this friction, occasions some expenditure of force by its want of flexibility or elasticity. These, and other causes, make the vibrations grow more and more narrow by degrees, till at last the pendulum is brought to rest. We must therefore have a contrivance in the wheelwork which will restore to the pendulum the small portion of force which it loses in every vibration. The action of the wheels therefore may be called a maintaining power, because it keeps up the vibrations. But this may affect the regularity of vibration. If it be supposed that the action of gravity renders all the vibrations isochronous, we must grant that the additional impulsion by the wheels will destroy that isochronism, unless it be so applied that the sum total of this impulsion and the force of gravity may vary so with the situation of the pendulum, as still to give a series of forces, or a law of variation, perfectly similar to that of gravity. This cannot be effected, unless we know both the law which regulates the action of gravity, producing isochronism of vibration, and the intensity of the force to be derived from the wheels in every situation of the pendulum.

Thus it appears that considerable scientific skill as well as mechanical ingenuity may be displayed in the construction of scapements; and the judicious consideration of them becomes of great importance to the artist: yet, notwithstanding this, no material improvement was made in them from the first application of the pendulum to clocks till the days of Mr. George Graham: nothing more was attempted before his time, than to apply the impulse of the swing wheel, in such manner as was attended with the least friction, and would give the greatest motion to the pendulum. Dr. Halley discovered, by some experiments made at the Royal Observatory at Greenwich, that by adding more weight to the pendulum, it was made to vibrate larger arcs, and the clock went faster; by diminishing the weight of the pendulum, the vibrations became shorter, and the clock went slower; the result of these experiments being diametrically opposite to what ought to be expected from the theory of the pendulum, probably first roused the attention of Mr. Graham, who was not only skilful in practice, but had much mathematical knowledge, and was well qualified to examine the subject scientifically: he soon made such farther trials as convinced him that this seeming paradox was occasioned by the retrograde motion, which was given to the swing-wheel by every construction of scapement that was at that time in use; and his great sagacity soon produced a remedy for this defect, by constructing a scapement which prevented all recoil of the wheels, and restored to the clock pendulum, wholly in theory, and nearly in practice, all its natural properties in its detached simple state: this scapement was named by its celebrated inventor the dead beat, and its great superiority was so universally acknowledged, that it was soon generally introduced into use, and yet continues in universal esteem: the importance of the scapement to the accurate going of clocks was by this improvement rendered so unquestionable, that artists of the first rate all over Europe were forward in producing each his particular construction, as may be seen in the works of Thiout L'Aineé M. J. A. Lepaute M. le Roy, M. Ferdinand Bertoud, and Mr. Cumming's Elements of Clock and Watch-work, in which we have a minute description of several new and ingenious constructions of scapements, with an investigation of the principles on which their claim to merit is founded; and a comparative view of the advantages or defects of the several constructions. Besides the scapements described in the above works, many curious constructions have been produced by eminent artists who have not published any account of them, nor of the motives which have induced each to prefer his favourite construc-

tion: Harrison, Hindley of York, Ellicot, Mudge, Arnold, Whitehurst, Earnshaw, and many other ingenious artists of this country, have made scapements of new and peculiar constructions. For descriptions of several of these we refer to the works just specified, and to Gregory's Mechanics, vol. ii. pp. 329—343. See also farther our article TIMEKEEPER.

SCAPHA. (σκαφη; a skiff, or cock-boat; from σκαπτω, to make hollow, because formerly they were made by excavating a large tree.) In anatomy, the excavation or cavity of the auricula or external ear, between the helix and antihelix.

SCAPHIDIUM. In the entomology of Fabricius, a tribe of the coleopterous genus SILPHA, which see.

SCAPHOID BONE. (*os scaphoides*, from σκαφη, a little vessel or boat, and ειδος, resemblance.) A bone of the tarsus. See NAVICULARE OS.

SCAPHOIDES OS. (σκαφοειδης; from σκαφη, a skiff, and ειδος, a likeness, applied to the first bone of the first row in the wrist, from its resemblance to a little boat.) See NAVICULARE OS.

SCAPULA. (from the Hebrew *schipha*.) Omoplata. Os homoplatæ. The shoulder blade. The scapula or shoulder blade, which approaches nearly to a triangular figure, is fixed, not unlike a buckler, to the upper posterior, and lateral part of the thorax, extending from the first to about the seventh rib. The anterior and internal surface of this bone is irregularly concave, from the impression, not of the ribs, as the generality of anatomists have supposed, but of the subscapularis muscle. Its posterior and external surface is convex, and divided into two unequal fossæ by a considerable spine, which, rising small from the posterior edge of the scapula, becomes gradually higher and broader as it approaches the anterior and superior angle of the bone, till at length it terminates in a broad and flat process, at the top of the shoulder, called the processus acromion. On the anterior edge of this processus acromion we observe an oblong, concave, articulating surface, covered with cartilage, for the articulation of the scapula with the clavicle. At its lower part the acromion is hollowed, to allow a passage to the supra and infra spinati muscles. The ridge of the spine affords two rough, flat surfaces, for the insertion of the trapezius and deltoid muscles. Of the two fossæ into which the external surface of the bone is divided by the spine, the superior one, which is the smallest, serves to lodge the supra spinatus muscle; and the inferior fossa, which is much larger than the other, gives origin to the infra spinatus. The triangular shape of the scapula leads us to consider its angles and its sides. The upper posterior angle is neither so thick, nor has so rough a surface, as the inferior one; but the most remarkable of the three angles of this bone is the anterior one, which is of great thickness, and formed into a glenoid cavity of an oval shape, the greatest diameter of which is from below upwards. This cavity, in the recent subject, is furnished with cartilage, and receives the head of the os humeri. The cartilaginous crust, which surrounds its brims, makes it appear deeper in the fresh subject than in the skeleton. A little beyond this glenoid cavity the bone becomes narrower, so as to give the appearance of a neck; and above this rises a considerable process, which, from being thick at its origin, becomes thinner, and in some degree flattened at its extremity. This process projects considerably, and is curved downwards. From its supposed resemblance to the beak of a bird, it is called the coracoid process. From the whole external side of this process a strong and broad ligament is stretched to the processus acromion, becoming narrower as it approaches the latter process, so as to be of a somewhat triangular shape. This ligament, and the two processes with which it is connected, are evidently intended for the protection of the joint, and to prevent a luxation of the os humeri upwards. Of the three sides of the scapula, the posterior one, which is the longest, is called the basis. This side is turned towards the vertebræ. Its other two sides are called costæ. The superior costa, which is the upper and shortest side, is likewise thinner than the other two, having a sharp edge. It is nearly horizontal, and parallel with the second rib; and is interrupted, near the basis of the coracoid process, by a semi-circular nitch, which is closed by a ligament that extends from one end of it to the other, and affords a passage to vessels and nerves. Besides this passage, there are other nitches in the scapula, for the transmission of vessels; viz. one between the coracoid process and the head of the bone, and another between its neck and the processus acromion. The third side of the scapula, or the inferior costa, as it is called, is of considerable thickness, and extends obliquely from the neck of the bone to its inferior angle, reaching from about the third to the eighth rib. The scapula has but very little cellular substance, and is of unequal thickness, being very thin at its middle part, where it is covered by a great number of muscles, and having its neck, the acromion, and coracoid process, of considerable strength. In the fœtus, the basis and the neck of the scapula, together with its glenoid cavity, acromion, coracoid process, and the ridge of the spine, are so many epiphyses with respect to the rest of the bone, to which they are not completely united till a considerable time after birth. The scapula is articulated to the clavicle and os humeri, to which last it serves as a fulcrum; and, by altering its position, it affords a greater scope to the bones of the arm in their different motions. It likewise affords attachment to a great number of muscles, and posteriorly serves as a defence to the thorax.

SCAPULA (John), the reputed author of a Greek lexicon, studied at Lausanne. His name is recorded in the annals of literature, neither on account of his talents nor learning, nor virtuous industry, but for a gross act of disengenuity and fraud which he committed against an eminent literary character of the 16th century.

Being employed by Henry Stephens as a corrector to his press while he was publishing his Thesaurus linguæ Grecæ, Scapula extracted those words and explications which he reckoned most useful, comprised them in one volume, and published them as an original work, with his own name. The compilation and printing of the Thesaurus had cost Stephens immense labour and expense; but it was so much admired by those learned men to whom he had shown it, and seemed to be of such essential importance to the acquisition of the Greek language, that he reasonably hoped his labour would be crowned with honour, and the money he had expended would be repaid by a rapid and extensive sale. But before his work came abroad, Scapula's abridgment appeared; which, from its size and price, was quickly purchased, while the Thesaurus itself lay neglected in the author's hands. The consequence was, a bankruptcy on the part of Stephens, while he who had occasioned it was enjoying the fruits of his treachery. Scapula's Lexicon was first printed in 1579, in 4to. It was afterwards enlarged, and published in folio. It has gone through several editions, while the valuable work of Stephens has never been reprinted. Its success is, however, not owing to its superior merits, but to its price and more commodious size. Stephens charges the author with omitting a great many important articles. He accuses him of misunderstanding and perverting his meaning; and of tracing out absurd and trifling etymologies which he himself had been careful to avoid. He composed the following epigram on Scapula:

Quidam επιλεμνιον *me* capulo *tenus abdidit ensem*
Æger eram a Scapulis, *sanus et huc redeo.*

Doctor Busby, so much celebrated for his knowledge of the Greek language, and his success in teaching it, would never permit his scholars at Westminster school to make use of Scapula.

SCA'PULAR. Sca'pulary. *a.* (*scapulaire*, Fr. from *scapula*, Latin.) Relating or belonging to the shoulders (*Wiseman*).

SCAR. *s.* (εσχαρα.) A mark made by a hurt or fire; a cicatrix (*Arbuthnot*).

To Scar. *v. a.* (from the noun.) To mark as with a sore or wound (*Shakspeare*).

SCARABÆUS. Beetle. In zoology, a genus of the class insecta, order coleoptera. Antennas clavate, the club lamellate; feelers four; fore-shanks generally toothed. Five hundred and fifty species scattered over the globe; thirty-three common to our own country. They are thus divided into sections and subsections.

A. Feelers filiform.
  α. Mandible arched.
  1. Without teeth.
    § Thorax horned; sentellate.
    § § Thorax horned; exsentellate.
    § § § Thorax unarmed; head horned; sentellate.
    § § § § Thorax unarmed; head horned; exsentellate.
    § § § § § Thorax and head unarmed; sentellate.
    § § § § § § Thorax and head unarmed; exsentellate.
  2. Mandible arched, slightly toothed; abdomen naked at the end, obliquely truncate; constituting the tribe melolontha of Fabricius.
    β Mandible straight; constituting the cetonia of Fabricius.
    γ Mandible straight, obtuse. The trichius of Fabricius.
B. Feelers cylindric; club of the antennas tunicate. The lethrus of Fabricius.
C. Feelers unequal, the fore-ones subclavate, the hind-ones filiform. The hexodon of Fabricius.

Formerly the name scarabæus was applied by naturalists to all insects whose wings are covered by crustaceous elytra or wing-shells: Linnéus, however, has discriminated these animals, and confined the term to one single genus.

The larves or grubs of the greater part of this genus lead a sedentary life under ground; residing most frequently in earth, while in a state of fermentation, by a large quantity of manure. Pure dung is the favourite food of many; and it is in its immediate vicinity that they chiefly delight to dwell. The cockchafer, the most common of all the beetle tribe, is produced from the ova of the female deposited under ground, where it remains during the whole of its larve state, devouring the roots of plants. In this destructive occupation the garden beetle, and all the hairy scarabæi are employed, till the period of their emancipation arrives, when they take wing, and, forsaking the roots, attack the leaves of plants. The larves of beetles have six feet, an annulate, hairy vesicular, at the end of the abdomen, and furnished with a horny head: though most of them delight in and feed on dung, a few support themselves otherwise: those of the cetoniæ feed on decayed wood; those of the melolonthæ on the roots of plants. Their nymphs lie dormant under the earth.

We shall select a few specimens.

1. S. stercorarius. Dor. Clock-beetle. Black; shield rhombic; crown a little prominent; shells grooved. Inhabits England and Europe generally. Flies about in an evening, in a circular direction, with a loud buzzing noise, and is said to foretell a fine day. By the Egyptians it was consecrated to the sun. Is infested with the acarus and ichneumon; body often with a blueish or greenish gloss, sometimes brassy beneath; shells frequently dull rufous.

2. S. fullo. Testaceous, spotted with white; scutel with a double white spot; antennas seven-leaved. Inhabits the sandy coasts of Europe and Barbary, and is the largest coleopterous insect ever found in England except the lucanus cervus. It is a very elegant species.

3. S. melolontha. Tree-beetle. Cock-chafer. Testaceous; thorax hairy; tail inflected; a triangular white spot at each incisure of the abdomen. Inhabits in great numbers the northern parts of Europe, and is the most

mischievous of all European insects: the grub is soft and grey, with testaceous head and legs; remains in the earth three years before it is transformed into the perfect insect, and devours the roots of corn and other vegetables, sometimes laying waste a large tract of country; in its beetle-form it sticks to trees, the leaves of which it feeds upon, and is eagerly sought after and devoured by swine, bats, crows, and poultry. If these appear in the autumn in considerable quantities, they are said to forerun epidemic disorders. It varies annually in having the thorax rufous and black; the male is distinguished by a pointed influted tail.

4. S. typhæus. Bull-comber. Thorax three-horned, the middle one less, lateral ones projecting, as long as the head, which is unarmed. This species is not very frequent in Britain, and is of very singular conformation. The body is broad and short; the shells have longitudinal streaks that disappear gradually as they proceed along its sides; the head projects, and the antennæ are very apparent. The colour of this insect is black, except the inferior parts of the body, which are partially covered with a few vibrissæ of a brown colour. What particularly distinguishes the typhæus is the peculiar form of the thorax; the two lateral points of which project beyond the head, having a small protuberance upon the side, whilst the middle point is shorter and somewhat raised. These long projecting horns seem given to the insect as offensive weapons, although it is incapable of using them: it is not always that the members of this tribe of beings are applied to the purposes that seem most obvious and natural to the observer.

From the resemblance which these thoracic horns bear to the long spears carried by the soldiers of the Macedonian phalanx, the French naturalists call this insect phalangist. The larves of the typhæus are most commonly found in cow dung, where the grown animal is also frequently to be seen, both for the purpose of collecting food and depositing its eggs.

5. S. pilularis. Dung beetle. This scarabæus is remarkable for choosing the most filthy residence, heaps of dung and excrementitious matter. It has several varieties, all of which resemble it, in the impurity of its habits, as well as its external form, viz. the blue scarabæus, with wing-shells and back smooth, and the head armed with a rhomboidal helmet prominent at the top: the scarabæus of an azure colour on the head and thorax, black legs, and pale-coloured wing-shells: the scarabæus of an oval figure, and black colour; the body smooth, and the elytra striated: and the scarabæus, whose head and thorax are black and without hairs, the legs pale.

These and many other pilular beetles are enumerated in the Fauna Swecica of Linnéus; their size and form are not very different, while they are characterised by the same manners: they prowl continually amid every kind of filth, some of them having the same nauseous smell with the impure substances which they devour.

The dung-beetle, which is here selected for description, is smooth and of a black colour above, in some mixed with green; on the lower side a few straggling vibrissæ. The head resembles a hood, raised in the middle, and projecting at the edges: the jaws extend beyond the head. The thorax has a groove in the middle; its circumference is marginated, and its figure round and smooth. The wing-shells are ornamented with a great number of longitudinal streaks: underneath, the colours are various and brilliant, consisting of different shades of blue and green. There is observable on the anterior thighs a spot formed by some red hairs, which, however, in some subjects is wanting. The tarsi appear weak and slender in proportion to the thighs, and this is uniformly the case with all the feet.

6. S. auratus. Golden beetle. This species is deemed the most beautiful of the English insects. The whole body is of a glossy green, tinged with yellow; underneath, these colours partake of a shade of red, which some naturalists have compared to leather, others to finely polished copper. In the brilliancy of its hues it rivals the emerald, and has sometimes been distinguished by that name.

This scarabæus in its vermicular state remains on the surface of the ground, or covered to a little depth with the mould; there it preys on the roots of tender plants. After it is transformed into a winged insect it chiefly delights in the flowers of the rose and piony: it is consequently an inhabitant of the gardens, where its transient beauty is reckoned a small compensation for the mischief it produces. In the impure abode of the dung-beetle, that animal may be less pleasing to the spectator; but in return it is productive of less harm, and is less exposed to injury in a dwelling, of which it remains the unenvied possessor. See Nat. Hist. Pl. CLXXII.

SCA'RAMOUCH. *s.* (*escarmouche*, Fr.) A buffoon in motley dress; usually one who assumes the appearance of stretching and contracting his neck longitudinally.

SCARBOROUGH, a seaport and borough in N. Yorkshire, with a market on Thursday. It is seated on a high rock, which has such craggy sides that it is almost inaccessible. On the top of this rock is a large green plain, with a little well of fresh water, and the remains of a castle, built by Henry II. This town is greatly frequented on account of its mineral waters, and also for sea-bathing; on which account it is much improved in the number and beauty of its buildings. The harbour is one of the best in the kingdom, with a commodious quay, several ship-yards, and a strong battery. Scarborough has a considerable trade, and is much engaged in the fisheries. It is 36 miles N.E. of York, and 214 N. of London. Lon. 0. 10 W. Lat. 54. 18 N.

SCARBOROUGH, a town and fort on the S.E. side of the island of Tobago. It was taken from the French by storm, by the English, in 1793. Lon. 60. 30 W. Lat. 11. 6 N.

SCARBOROUGH WATER. There are two

species of chalybeate water found in this spot, and they differ considerably in their composition, though they rise nearly contiguous to each other. The one is a simple carbonated chalybeate similar to the Tunbridge water; the other, which is better known and more frequented, and more particularly distinguished as Scarborough water, has, in conjunction with the iron, a considerable admixture of a purging salt, which adds much to its value. The diseases in which it is ordered are similar to those in which Cheltenham water is prescribed, only it is necessary to increase the purgative effect of this water by adding similar salts. It is therefore chiefly as an alterative that this water can be employed in its natural state.

SCARBOROUGH (Sir Charles), a learned physician in the reigns of Charles II. James II. and William III. to each of whom he was first physician. He succeeded Dr. Harvey, as lecturer on anatomy and surgery, and published several books on his own profession. He died in 1693.

SCARCE. *a.* (*scarso*, Ital.) 1. Not plentiful; not copious (*Locke*). 2. Rare; not common (*Addison*).

SCARCE. SCA'RCELY. *ad.* (from the adjective.) 1. Hardly; scantly (*Hooker*). 2. With difficulty (*Dryden*).

SCA'RCENESS. SCA'RCITY. *s.* (from *scarce.*) 1. Smallness of quantity; not plenty; penury (*Addison*). 2. Rareness; infrequency; not commonness (*Collier*).

SCARDONA, a town of European Turkey, in Dalmatia, and a Greek bishop's see. The Venetians ruined the fortifications, and its principal buildings, in 1537; but the Turks have since put it in a state of defence. It is seated on the Cherca, 35 miles N.W. of Spalatro. Lon. 17. 1 E. Lat. 44. 29 N.

To SCARE. *v. a.* (*scorare*, Ital. *Skinner.*) To fright; to frighten; to affright; to terrify; to strike with sudden fear (*Calamy*).

SCA'RECROW. *s.* (*scare* and *crow.*) An image or clapper set up to fright birds; thence, any vain terror (*Raleigh*).

SCA'REFIRE. *s.* (*scare* and *fire.*) A fright by fire; a fire breaking out so as to raise terror (*Holder*).

SCARF. *s.* (*escharfe*, French.) Any thing that hangs loose upon the shoulders or dress (*Shakspeare*).

To SCARF. *v. a.* (from the noun.) 1. To throw loosely on (*Shakspeare*). 2. To dress in any loose vesture (*Shakspeare*).

SCA'RFSKIN. *s.* (*scarf* and *skin.*) The cuticle; the epidermis; the outer scaly integuments of the body. See CUTICLE.

SCARIFICA'TION. *s.* (*scarificatio*, Lat.) Incision of the skin with a lancet, or such like instrument (*Arbuthnot*).

SCARIFICA'TOR. *s.* (from *scarify*). One who scarifies.

SCA'RIFIER. *s.* (from *scarify.*) 1. He who scarifies. 2. The instrument with which scarifications are made.

To SCA'RIFY. *v. a.* (*scarifico*, Lat.) To let blood by incisions of the skin, commonly after the application of cupping glasses (*Wiseman*).

SCARIOLA. See LACTUCA SYLVESTRIS.

SCARIOUS LEAF, in botany. Scariosum folium. Called skinny by Dr. Withering. Substantia sicca arida tactu sonora. Of a dry substance, sonorous to the touch.—Applied to a perianth, which is membranous, tough, thin, and semi-transparent; as in statice armeria, or thrift, centaurea glastifolia, &c.—Also to the nectary; in narcissus poeticus—spike, &c.

SCARITES. In the entomology of Fabricius, a tribe of the coleopterus genus TENEBRIO, which see.

SCARLATINA. (from *scarlatto*, a lively red, Ital.) The scarlet fever. A genus of diseases in the class pyrexiæ and order exanthemata of Cullen; characterized by contagious synocha; the fourth day the face swells; a scarlet eruption appears on the skin in patches; which after three or four days ends in the desquamation of the cuticle, or is succeeded by anasarca. It has two species: 1. Scarlatina simplex, the mild. 2. Scarlatina cynanchica, or anginosa, with ulcerated sore throat. See MEDICINE.

SCARLET, a beautiful bright red colour.

SCARLET BEAN, in botany. See PHASEOLUS.

SCARLET CARDINAL FLOWER, in botany. See LOBELIA.

SCARLET CONVOLVULUS, in botany. See IPOMÆA.

SCARLET HORSE CHESNUT, in botany. See PAVIA.

SCARLET JASMINE, in botany. See BIGNONIA.

SCARLET LUPIN, in botany. See LATHYRUS.

SCARLET OAK, in botany. See QUERCUS.

SCARLET FEVER. See SCARLATINA.

SCARP, in fortification, is the interior talus, or slope of the ditch next the place, at the foot of the rampart.

SCARP, in heraldry, the scarf which military commanders wear for ornament. It is borne somewhat like a battoon sinister, but is broader than it, and is continued out to the edges of the field; wheras the battoon is cut off at each end.

SCARPANTO, an island in the Mediterranean, 18 miles long and six broad, lying S.W. of Rhodes. It is mountainous and rocky, abounds in cattle and game, and has quarries of marble. The Turks are masters of it, but the inhabitants are Greeks. The principal town on the W. coast has a good harbour. Lon. 27. 40 E. Lat. 35. 45 N.

SCARRON (Paul), a celebrated comic writer, born at Paris in 1610. He was made canon of Mans, and on removing from thence in 1638 to a damp situation, he lost the use of his limbs; notwithstanding which, his burlesque humour never forsook him, his house being always the rendezvous for men of wit.

In 1651 he married M. d'Aubigne, afterwards the famous Madam de Maintenon, when only 16 years old. He died at Paris in 1660. His best piece is his Comical Romance: his Eneide Travestie is full of buffoonery, and in that quality might have disconcerted the gravity even of Virgil.

SCARUS. In zoology, a genus of the class pisces, order thoracica. Instead of teeth, strong bony processes, crenate at the edges; gill-membrane five-rayed, the covers very entire; lateral line mostly branched. Eight species.

The following are the chief.

1. S. rivulatus. Jaws continuous, smooth, serrate, with most minute teeth at the edges, the teeth approximate, filiform, growing a little less from the middle of the lip. Inhabits Arabia; near a yard long; body blueish, with black spots and longitudinal narrow rivulets; feeds on herbs; scales very minute; flesh eatable, though the spines of the rays produce a temporary inflammation.

2. S. stellatus. Body oval, stellate, with contiguous, nearly hexagonal spots. Inhabits Arabia, among banks of coral; half a foot long; feeds on herbs; scales round, small.

3. S. ghobban. Tail even; jaws whitish; patches on the head and outer edge of the fins green-blue. Inhabits Arabia; body whitish; scales with each a transverse blueish stripe in the middle, and one at the base, also with brown longitudinal streaks.

SCATCH-MOUTH, in the manage, a bit-mouth differing from a cannon-mouth in this, that the cannon-mouth is round, whereas the scatch-mouth is more oval.—Commonly snaffles are scatch-mouths. See the articles BIT-MOUTH and CANNON-MOUTH.

SCATE. *s.* (*skidor*, Swedish.) A kind of wooden shoe, with a steel plate underneath, on which men slide rapidly over the ice.

To SCATE. *v. n.* (from the noun.) To slide on scates. See SKATING.

SCA'TEBROUS. *a.* (from *scatebræ*, Lat.) Abounding with springs.

To SCATH. *v. a.* (ſceaðan, ſcaðan, Sax. *scharden*, Dutch.) To waste; to damage; to destroy: obsolete (*Milton*).

SCATH. *s.* (ſceðða, Sax.) Waste; damage; mischief; depopulation: obsolete (*Fairfax*).

SCA'THFUL. *a.* (from *scath.*) Mischievous; destructive (*Shakspeare*).

SCATICA CRESSES. See IBERIS.

To SCA'TTER. *v. a.* (ſcateꝛnan, Sax. *scatteren*, Dutch.) 1. To throw loosely about; to sprinkle (*Thomson*). 2. To dissipate; to disperse (*Milton*). 3. To spread thinly (*Dryden*). 4. To besprinkle with something loosely spread.

To SCA'TTER. *v. n.* To be dissipated; to be dispersed (*Bacon*).

SCATTERED, in botany. Sparsus. Applied to branches, leaves, &c. which come out without any apparent regular order.

SCA'TTERINGLY. *ad.* (from *scattering.*) Loosely; dispersedly (*Abbot*).

SCA'TTERLING. *s.* (from *scatter.*) A vagabond; one that has no home or settled habitation (*Spenser*).

SCATU'RIENT. *a.* (*scaturiens*, Latin.) Springing as a fountain.

SCATURI'GINOUS. *a.* (from *scaturigo*, Lat.) Full of springs or fountains.

SCA'VENGER. *s.* (from ſcaꝛan, Sax. to shave.) A petty magistrate, whose province is to keep the streets clean: more commonly the labourer employed in removing filth (*South*).

SCAURUS. This name was common to many eminent Romans, the most celebrated of whom is—(M. Æmilius) a Roman consul, who distinguished himself by his eloquence at the bar, and by his successes in Spain, in the capacity of commander. He was sent against Jugurtha, and some time after accused of suffering himself to be bribed by the Numidian prince. He was originally very poor. His son of the same name made himself known by the large theatre he built during his edileship. This theatre, which could contain 30,000 spectators, was supported by 360 columns of marble, 38 feet in height, and adorned with 3000 brazen statues.

SCAURUS. In the entomology of Fabricius, a tribe of the genus TENEBRIO, which see.

SCEDASUS, a native of Leuctra, in Bœotia. His two daughters, Meletia, and Molpia, whom some call Theano or Hippo, were ravished by some Spartans in the reign of Cleombrotus, and after this they killed themselves, unable to survive the loss of their honour. The father became so disconsolate, that when he was unable to obtain relief from his country, he killed himself on their tomb.

SCELERATUS, a plain at Rome, near the Colline gate, where the vestal Minucia was buried alive, when convicted of adultery.—One of the gates of Rome was called Scelerata, because 300 Fabii, who were killed at the river Cremera, had passed through it when they went to attack the enemy.

SCENA DA CAMERA. (Ital.) An expression applied by the Italians to all vocal compositions not designed for the church or theatre, but the chamber only; as Cantatas, Canzonets, &c.

SCE'NARY. *s.* (from *scene.*) 1. The appearances of place or things (*Addison*). 2. The representation of the place in which an action is performed (*Pope*). 3. The disposition and consecution of the scenes of a play (*Dryden*).

SCENE. *s.* (*scæna*, Latin; σκηνη.) 1. The stage; the theatre of dramatic poetry. 2. The general appearance of any action; the whole contexture of objects; a display; a series; a regular disposition (*Addison*). 3. Part of a play (*Granville*). 4. So much of an act of a play as passes between the same persons in the same place (*Dryden*). 5. The place represented by the stage (*Shakspeare*). 6. The hanging of the theatre adapted to the play (*Bacon*).

The original scene for acting of plays was as simple as the representations themselves: it consisted only of a plain plot of ground proper for the occasion, which was in some degree shaded by the neighbouring trees, whose branches were made to meet together, and their

vacancies supplied with boards, sticks, and the like; and to complete the shelter, these were sometimes covered with skins, and sometimes with only the branches of other trees newly cut down, and full of leaves. Afterwards more artificial scenes, or scenical representations, were introduced, and paintings used instead of the objects themselves. Scenes were then of three sorts; tragic, comic, and satyric. The tragic scene represented stately magnificent edifices, with decorations of pillars, statues, and other things suitable to the palaces of kings: the comic exhibited private houses with balconies and windows, in imitation of common buildings: and the satyric was the representation of groves, mountains, dens, and other rural appearances; and these decorations either turned on pivots, or slid along grooves, as those in our theatres.

To keep close to nature and probability, the scene should never be shifted from place to place in the course of the play: the ancients were pretty severe in this respect, particularly Terence, in some of whose plays the scene never shifts at all, but the whole is transacted at the door of some old man's house, whither with inimitable art he occasionally brings the actors. The French are pretty strict with respect to this rule; but the English pay very little regard to it.

Scene is also a part or division of a dramatic poem. Thus plays are divided into acts, and acts are again subdivided into scenes; in which sense the scene is properly the persons present at or concerned in the action on the stage at such a time; whenever, therefore, a new actor appears, or an old one disappears, the action is changed into other hands; and therefore a new scene then commences. It is one of the laws of the stage, that the scenes be well connected; that is, that one succeed another in such a manner as that the stage be never quite empty till the end of the act. See DRAMA.

SCENIC GAMES, *ludi scenici*, among the ancients, were entertainments exhibited on the scena, or theatre; including what we now call plays, of all kinds, with dancing, and other theatrical performances.

The Romans were almost four hundred years without any scenic games at all. Livy observes, that they were first instituted in the year of Rome 392, under the consulate of C. Sulpitius Peticus, and C. Licinius Stolo. But the critics have observed a mistake here in Livy; the consulate of those persons falling in the year 389, which, therefore, is held the æra of the introduction of the scenic games.

SCENOGRA'PHICAL. *a.* (σκηνη and γραφω.) Drawn in perspective.

SCENOGRA'PHICALLY. *ad.* (from *scenographical.*) In perspective (*Mortimer*).

SCENOGRAPHY, formed from σκηνη, scene, and γραφη, description, in perspective, a representation of a body on a perspective plane; or a description thereof in all its dimensions, such as it appears to the eye.

The ichnography of a building, &c. represents the plan, or ground-work, of the building; the orthography the front, or one of the sides; and the scenography the whole building, front, sides, height, and all, raised on the geometrical plan.

SCENOGRAPHY is also used for scene-painting, and denotes the art of painting upon several planes or scenes, at different distances, and in various positions with respect to the eye, in such a manner, that all those different scenes, when seen from one certain determinate point, may correspond with each other, and represent one entire view of the design without breaks or confusion, as if it were one continued picture.

The design of scene-painting is not only to decorate the theatre, but to make that part of it, which lies beyond the stage, appear much longer than it really is. This is effected by raising the floor to a certain angle, by sloping the cieling, and by raising the scenes in such a manner, that the floor, cieling, and scenes, shall be part of a hollow pyramid, which, if continued, would meet in a point; and after having diminished each scene in its due proportion, then by drawing thereupon the intended design, by the common rules of perspective; so that every scene, when put into its proper place, shall appear as a part of the general design. On this subject, see Pozzo's Perspective, 1709. fol. Hamilton's Stereography, in 2 vols. fol. 1738. And, for an abstract, Kirby's Perspective, book ii. cap. 7.

SCENOPEGIA, σκηνοπηγια, formed of σκηνη, scene, tabernacle, tent, and πηγνυμι, *figo*, I fix, the third grand festival among the Jews, at which all their males were to attend at the national altar, more usually called feast of tabernacles, instituted after the people of Israel were in possession of the land of Canaan, in memory of their having dwelt under tents in the wilderness.

The scenopegia was held for seven days successively, commencing on the fifteenth of September, i. e. on the fifteenth day of the month Tifri, the first of the civil and seventh of the ecclesiastical year. To these seven days there was also added an eighth day which was much the most solemn; both on account of the conflux of persons, and of the extraordinary tokens they all gave of their joy. This eighth day was properly the feast of ingathering, on which they were to give thanks for their whole harvest. However, the feast of tabernacles, and that of ingathering, though properly distinct, are sometimes spoken of as one feast, and the name of either indifferently applied to the other.

It is of this eighth day St. John must be understood to speak, when he tells us, our Saviour was at the feast of tabernacles, on the last and great day.

The rabbis inform us, that there pertained to this feast a peculiar ceremony of drawing water out of the pool of Siloam, and pouring of it, mixed with wine, on the sacrifice, as it lay on the altar. This they are said to have done with such expressions of joy, that it became a common proverb, "He that never saw

the rejoicing of drawing water, never saw rejoicing in all his life." To this ceremony our Saviour is supposed to refer, John vii. 37, 38.

It is the practice of the modern Jews to tie together one branch of palm, three branches of myrtle, and one of willow; and with this in their right hands, and a branch of citron with its fruit in the left, to make a procession, during the seven days of the feast, in their synagogues, round their reading desks, as their ancestors did round the walls of Jericho, in token of the expected downfal of their enemies. They also turn about with these branches to the four cardinal points, and shake or push them every way, to drive the devil from them. While they are making this procession, they sing Hosannah; whence this feast is called Hosannah.

When the Holy Scripture says absolutely *the feast*, it is usually to be understood of the scenopegia.

SCENT. *s.* (*scenter*, to smell, Fr.) 1. The power of smelling; the smell (*Watts*). 2. The object of smell; odour good or bad (*Denham*). 3. Chase followed by the smell (*Temple*).

For the physiology and cause of scent, see SMELL.

To SCENT. *v. a.* (from the noun.) 1. To smell; to perceive by the nose (*Milton*). 2. To perfume; or to imbue with odour good or bad (*Addison*).

SCE'NTLESS. *a.* (from *scent.*) Inodorous; having no smell.

SCEPTIC, σκεπτικος, from σκεπτομαι, I consider, look about, or deliberate, properly signifies considerative and inquisitive, or one who is always weighing reasons on one side and the other without ever deciding between them. It is chiefly applied to an ancient sect of philosophers founded by Pyrrho (see PYRRHO), who, according to Laertius, had various other denominations. From their master they were called Pyrrhonians; from the distinguishing tenets or characteristic of their philosophy they derived the name of Aporetici, from απορειν, to doubt; from their suspension and hesitation they were called ephectici, from επεχειν, to stay or keep back; and lastly, they were called zetetici or seekers, from their never getting beyond the search of truth.

That the sceptical philosophy is absurd, can admit of no dispute in the present age; and that many of the followers of Pyrrho carried it to the most ridiculous height, is no less true. But we cannot believe that he himself was so extravagantly sceptical as has sometimes been asserted, when we reflect on the particulars of his life, which are still preserved, and the respectful manner in which we find him mentioned by his contemporaries and writers of the first name who flourished soon after him. The truth, as far as at this distance of time it can be discovered, seems to be, that he learned from Democritus to deny the real existence of all qualities of bodies, except those which are essential to primary atoms, and that he referred every thing else to the perceptions of the mind produced by external objects, in other words, to appearance and opinion. All knowledge of course appeared to him to depend on the fallacious report of the senses, and consequently to be uncertain; and in this notion he was confirmed by the general spirit of the Eleatic school in which he was educated. He was further confirmed in his scepticism by the subtilties of the Dialectic schools, in which he had been instructed by the son of Stilpo; choosing to overturn the cavils of sophistry by recurring to the doctrine of universal uncertainty, and thus breaking the knot which he could not unloose. For being naturally and habitually inclined to consider immoveable tranquillity as the great end of all philosophy, he was easily led to despise the dissentions of the dogmatists, and to infer from their endless disputes, the uncertainty of the questions on which they debated; controversy, as it has often happened to others, becoming also with respect to him the parent of scepticism.

Pyrrho's doctrines, however new and extraordinary, were not totally disregarded. He was attended by several scholars, and succeeded by several followers, who preserved the memory of his notions. The most eminent of his followers was Timon, in whom the public succession of professors in the Pyrrhonic school terminated. In the time of Cicero it was almost extinct, having suffered much from the jealousy of the dogmatists, and from a natural aversion in the human mind to acknowledge total ignorance, or to be left in absolute darkness. The disciples of Timon, however, still continued to profess scepticism, and their notions were embraced privately at least by many others. The school itself was afterwards revived by Ptolemæus a Cyrenian, and was continued by Ænesidemus a contemporary of Cicero, who wrote a treatise on the principles of the Pyrrhonic philosophy, the heads of which are preserved by Photius. From this time it was continued through a series of preceptors of little note to Sextus Empiricus, who also gave a summary of the sceptical doctrine.

A system of philosophy thus founded on doubt, and clouded with uncertainty, could neither teach tenets of any importance, nor prescribe a certain rule of conduct; and accordingly we find that the followers of scepticism were guided entirely by chance. As they could form no certain judgment respecting good and evil, they accidentally learned the folly of eagerly pursuing any apparent good, or of avoiding any apparent evil; and their minds of course settled into a state of undisturbed tranquillity, the grand postulatum of their system.

Plato refutes the great principle of the sceptics thus: when you say, that all things are incomprehensible, do you comprehend or conceive that they are thus incomprehensible, or do you not? if you do, then something is comprehensible; if you do not, there is no reason we should believe you, since you do not comprehend your own assertion.

Sextus Empiricus observes, that Socrates himself had a tincture of scepticism: some even make him the author of it, from that customary saying of his, "I know nothing but this, that I know nothing." If this were the origin of scepticism, it must be owned, it was mightily improved afterwards, before Metrodorus said, "I know nothing, not even this, that I know nothing." The same Sextus, however, adds, that Plato, introducing his master in his gymnastic dialogues, disputing with the sophists, makes him act the part of a sceptic.

Scepticism has not been confined entirely to the ancients and to the followers of Pyrrho. Numerous sceptics have arisen also in modern times, varying in their principles, manners, and character, as chance, prejudice, vanity, weakness, or indolence, prompted them. The great object, however, which they seem to have in view, is to overturn, or at least to weaken, the evidence of analogy, experience, and testimony; though some of them have even attempted to show, that the axioms of geometry are uncertain, and its demonstrations inconclusive. This last attempt has not indeed been often made; but the chief aim of Mr. Hume's philosophical writings is to introduce doubts into every branch of physics, metaphysics, history, ethics, and theology. It is needless to give a specimen of his reasonings in support of modern scepticism. The most important of them have been noticed elsewhere (see MIRACLE and PHILOSOPHY), and such of our readers as have any relish for speculations of that nature can be no strangers to his Essays, or to the able refutations of them by the Doctors Reid, Campbell, Gregory, and Beattie, who have likewise exposed the weakness of the sceptical reasonings of Des Cartes, Malbranche, and other philosophers of great fame in the same school.

SCEPTICISM, the doctrines and opinions of the sceptics. See the preceding article.

SCEPTRE, a kind of royal staff, or batoon, borne on solemn occasions by kings, as a badge of their command and authority. Nicod derives the word from the Greek σκηπτρον, which he says originally signified a javelin, which the ancient kings usually bore as a badge of their authority; that instrument being in very great veneration among the heathens. But σκηπτρον does not properly signify a javelin, but a staff to rest upon, from σκηπω, *innitor*, I lean upon. Accordingly, in the simplicity of the earlier ages of the world, the sceptres of kings were no other than long walking staves: and Ovid, in speaking of Jupiter, describes him as resting on his sceptre (Met. i. ver. 178). The sceptre is an ensign of royalty of greater antiquity than the crown. The Greek tragic and other poets put sceptres in the hands of the most ancient kings they ever introduce. Justin observes, that the sceptre, in its original, was an *hasta*, or spear. He adds, that, in the most remote antiquity, men adored the hastæ or sceptres as immortal gods; and that it was upon this account, that, even in his time, they still furnished the gods with sceptres.—Neptune's sceptre is his trident. Tarquin the Elder was the first who assumed the sceptre among the Romans. Le Gendre tells us, that, in the first race of the French kings, the sceptre was a golden rod, almost always of the same height with the king who bore it, and crooked at one end like a crozier.

SCEPTRED, *a.* (from *sceptre*.) Bearing a sceptre (*Milton*).

SCHÆFFERA, in botany, a genus of the class dioecia, order pentandria. Male: calyx four or five-leaved; corol four-petalled or none. Female: calyx four or five-parted; corol four-parted or none; styles two; berry two-celled; seeds solitary. Two species; West India plants; one schæffera completa, a four-petalled axillary flower; the other schæffera laterifolia, a petalless lateral flower.

SCHAFHAUSEN, a canton of Swisserland, 15 miles long and 10 broad; bounded on the W. and N. by Suabia, E. by the canton of Zurich and the bishopric of Constance, and S. by the same and Thurgau. The reformation was introduced here in 1529, and the religion is Calvinism. The principal article of trade is wine, the country abounding in vineyards; and as the canton affords but little corn, it is procured from Suabia in exchange for wine.

SCHAFHAUSEN, a town of Swisserland, capital of a canton of the same name. It is seated on the Rhine, and owes its origin to the interruption of the navigation of that river by the cataract at Lauffen; huts being at first constructed for the convenience of unloading the merchandise from the boats, by degrees increased to a large town. Though a frontier town, it has no garrison, and the fortifications are weak. It had a famous wooden bridge over the Rhine, which is here near 400 feet wide; it was a kind of hanging bridge; for the road did not pass over the arch, but was suspended from it, and almost level. This curious bridge was burnt by the French, when they evacuated the town, after being defeated by the Austrians, in 1799. Schafhausen is 22 miles N. by E. of Zurich, and 39 E. of Basle. Lon. 3. 41 E. Lat. 47. 39 N.

SCHALCKEN (Godfrey), an eminent Dutch painter, born at Dort in 1643. He was a disciple of Gerard Douw, whose style he happily adopted. He resided for some time in London, and painted the portrait of king William III. by candle-light, the king holding the candle himself. He was equally skilful in historical painting, and died in 1706.

SCHALHOLT, a town of Iceland, and a bishop's see, with a college. Lon. 22. 20 W. Lat. 64. 40 N.

SCHAMACHIE, a town of Persia, capital of Schirvan. It was formerly very large, but is now decayed, above 6000 houses having been thrown down by an earthquake. It has manufactures of silks and cottons, and is supplied with most Russian commodities. It stands in a valley, between two mountains, 24 miles W. of the Caspian sea, and 250 N.E. of Tauris. Lon. 51. 5 E. Lat. 40. 50 N.

SCHARNITZ, a fortified town of Germany, in Tyrol, which defends a pass over the mountains, of considerable importance. It surrendered to the French and Bavarians in 1805. It stands on the confines of Bavaria, 12 miles N. of Inspruc.

SCHE'DULE. *s.* (*schedula*, Latin.) 1. A small scroll (*Hooker*). 2. A writing additional or appendant (*Donne*). 3. A little inventory.

SCHEELE (Charles William), who has often been termed the Newton of chemistry, was born at Stralsund in 1742. One of the most curious theories of light and caloric was formed by this philosopher. Without the assistance of education or of wealth, his genius burst forth with astonishing lustre; and at an age when most philosophers are only rising into notice, he had finished a career of discoveries which till lately had no parallel in chemistry. Whoever wishes to behold ingenuity combined with simplicity, whoever wishes to see the inexhaustible resources of chemical analysis, whoever wishes for a model in chemical researches—has only to peruse and to study the works of Scheele. After a vast number of experiments, conducted with astonishing ingenuity, he concluded, that caloric was composed of a certain quantity of oxygen combined with phlogiston; that radiant heat, a substance which he supposed capable of being propagated in straight lines like light, and not capable of combining with air, was composed of oxygen united with a greater quantity of phlogiston, and light of oxygen united with a still greater quantity. He supposed, too, that the difference between the rays depended upon the quantity of phlogiston; the red, according to him, contained the least; the violet, the most phlogiston. By phlogiston Mr. Scheele seems to have meant hydrogen; it is needless therefore to examine his theory here.

In the year 1777 Scheele was appointed by the Medical College to be apothecary at Koping. It was often wished that he could be drawn from his retirement at this place, and move in a larger sphere. It was suggested to him, that a place might be procured in England, which might afford him a good income and more leisure; and, indeed, latterly an offer was made to him of an annuity of 300l. if he would settle in this country. But death, alas! put an end to this project. For half a year before this melancholy event, his health had been declining, and he himself was sensible that he should not recover. On the 19th of May, 1786, he was confined to his bed; on the 21st he bequeathed all of which he was possessed to his wife (who was the widow of his predecessor at Koping, and whom he had lately married); and on the same day he departed this life. So the world lost, in less than two years, Bergman and Scheele, of whom Sweden may justly boast; two philosophers, who were beloved and lamented by all their cotemporaries, and whose memory posterity will never cease most gratefully to revere.

Scheele's moral character, according to Erhart and others, who were the companions of his youth, and Messrs. Gadolin, Espling, and those who knew him in his latter days, was irreproachable and praiseworthy. His outward appearance was not expressive of the great mind which lay concealed as it were under a veil. He seldom joined in the usual conversations and amusements of society, having as little leisure as inclination to do so; for, what little time he had to spare from the hurry of his profession was constantly filled up in the prosecution of experiments. It was only when he received visits from his friends, with whom he could converse upon his favourite science, that he indulged himself in a little relaxation. For such friends he had a sincere affection, as he had also for those that lived at a distance, and even for such as were not personally known to him. He kept up a regular correspondence with Messrs. Erhart, Meyer, Kirwan, Crell, and several other chemists. See *Crell's Life of Scheele.*

SCHEFFLERA, in botany, a genus of the class pentandria, order decagynia. Calyx five-toothed, superior; petals five; capsule eight or ten-celled; the cells one-seeded. One species only, a native of New Zealand; and suspected, by Dryander, to be a species of aralia.

SCHEIK, a name given by the Turks to the prelates of the Mahometan religion, who pretend to be the legitimate successors of Mahomet. Their chief resides at Mecca.

SCHEINER (Christopher), a German mathematician, astronomer, and Jesuit, eminent for being the first who discovered spots on the sun, was born at Schwaben, in the territory of Middleheim, in 1575. He first discovered spots on the sun's disc, in 1611, and made observations on these phænomena at Rome, until at length reducing them to order, he published them in one volume folio, in 1630. He wrote also some smaller things relating to mathematics and philosophy, and died in 1650.

SCHELD, a river which rises in France, on the confines of the late province of Picardy, and runs north-east by Cambray, Valenciennes, Tournay, Oudenarde, &c. and, receiving the Lis at Ghent, runs east by Dendermond, and then north to Antwerp; below which city it divides into two branches, one called the Wester-Scheld, which separates Flanders from Zealand, and discharges itself into the sea near Flushing; and the other called the Oster-Scheld, which runs by Bergen-op-zoom, and afterwards between the islands Beveland and Schowen, and, a little below, falls into the sea. In 1792, when the French took Antwerp, they insisted upon opening the navigation of this river, on the plea that all rivers were free, and that the consequent right of navigating it could not be ceded by any treaty whatever. This, with their invasion of Holland, drew that country and Great Britain into the general coalition against them, at the commencement of 1793.

SCHELESTADT, a strong town of France, in the department of Upper Rhine, seated on the river Ill, 20 miles S.W. of Strasburg. Lon. 7. 40 E. Lat. 48. 17 N.

SCHELLA, a town of Upper Hungary, seated on the Waag, 25 miles N.E. of Presburg. Lon. 17. 40 E. Lat. 48. 32 N.

SCHELLENBURG, a fortress of Bavaria, remarkable for a victory obtained here by the allies, over the French and Bavarians, in 1704. It is 22 miles W. of Ingolstadt. Lon. 10. 58 E. Lat. 48. 46 N.

SCHELLING, an island of the United Provinces, in Friesland, lying at the entrance of the Zuider-Zee. Lon. 5. 10 E. Lat. 53. 20 N.

SCHE'MATISM. *s.* (σχηματισμος.) 1. Combination of the aspects of heavenly bodies. 2. Particular form or disposition of a thing.

SCHE'MATIST. *s.* (from *scheme.*) A projector, one given to forming schemes.

SCHEME. *s.* (σχημα.) 1. A plan; a combination of various things into one view, design, or purpose (*Atterbury*). 2. A project; a contrivance; a design (*Swift*). 3. A representation of the aspects of the celestial bodies; any lineal or mathematical diagram (*Hudib.*).

SCHE'MER. *s.* (from *scheme.*) A projector; a contriver.

SCHEMNITZ, a town of Upper Hungary, one of the seven mountain-towns, with three castles. It is famous for mines of silver and other metals; as also for its hot baths. Near it is a high rock of shining blue stone, mixed with green and some spots of yellow. It is 50 miles N.E. of Presburg.

SCHENCK, a fortress of Dutch Guelderland, seated on the point where the Rhine divides into two branches, the Rhine and the Wahal. It is of great importance, as the centre of communication between Holland and Germany, and is 13 miles E. of Nimeguen. Lon. 5. 26 E. Lat. 51. 55 N.

SCHENINGEN, a town of Lower Saxony, which gives name to a district in the principality of Wolfenbuttle. It is 16 miles N. of Halberstadt, and 18 E.S.E. of Wolfenbuttle. Lon. 11. 25 E. Lat. 52. 22 N.

SCHER, a town of Suabia, belonging to the baron of Walburg, seated on the Danube, 36 miles S.W. of Ulm. Lon. 9. 32 E. Lat. 48. 8 N.

SCHEROMA. A dryness of the eye from the want of the lacrymal fluid. The effects of this lacrymal fluid being deficient, the eyes become dry, and in their motions produce a sensation as though sand, or some gritty substances, were between the eye and the eye-lid; the vision is obscured, the globe of the eye appears foulish and dull, which is a bad omen in acute diseases. The species are, 1. *Scheroma febrile*, or a dryness of the eyes, which is observed in fevers, complicated with a phlogistic density of the humours. 2. *Scheroma exhaustorum*, which happens after great evacuations, and in persons dying. 3. *Scheroma inflammatorum*, which is a symptom of the opthalmia sicca. 4. *Scheroma itinerantium*, or the dryness of the eyes, which happens in sandy places to travellers, as in hot Syria, or from dry winds, which dries up the humidity necessary for the motion of the eyes.

SCHE'SIS. *s.* (σχεσις.) A habitude; state of any thing with respect to other things (*Nor.*).

SCHETLAND. See SHETLAND.

SCHEUCHZERIA. In botany, a genus of the class hexandria, order trigynia. Calyx six-parted; corolless; styleless; capsules three, superior, inflated, one or two-seeded; anthers linear. One species only; though many more are sometimes erroneously supposed to belong to it. This is a native of Europe, with lateral stigmas, and three, five, or six capsules in each.

SCHIAVONE (Andrea), a painter, born in 1522, at Sebenico, in Dalmatia, and died at Venice in 1582. He learnt the art from necessity, and this hard lot hindered him from acquiring every part of it. His designs are imperfect, but this defect did not prevent him from being placed in the rank of the most celebrated artists. He had great taste in drapery, and his attitudes were well chosen. Tintoret had one of Schiavone's pictures before him always while he was painting.

SCHIEDAM, a town of the United Provinces, in Holland, seated on a canal, which communicates with the Maese, four miles E. by S. of Rotterdam. Lon. 4. 30 E. Lat. 51. 54 N.

SCHILLER (Frederic), a German dramatic writer. He was born at Marbach, in Wirtemburg, and educated at Stutgard, where he produced his first dramatic piece, called The Robbers. The principles of this piece gave such offence to his superiors, that he fled to Manheim, and for some time supported himself in the capacity of a regimental surgeon. An appointment in the theatre at Manheim proved more congenial to his feelings, and enabled him to produce his conspiracy of Fiesco, his Intrigue and Love, his Rhenish Thalia, and other pieces. He went next to Mentz, and afterwards to Dresden, and then to Leipsic, where he completed his tragedy of Don Carlos. For some time he resided at Jena as professor of history, and then removed to Weimar, where he died 1805. He wrote besides, the History of the Revolt of the Netherlands from the Spanish Government, the Maid of Orleans, and other dramatic pieces, much admired for originality, fire, and elegance, though too often immoral, and deficient in unity.

SCHINTZNACH, a town of Swisserland, in the canton of Bern, remarkable for its agreeable position on the Aar, and its tepid mineral waters. Near it, on a lofty eminence, are the ruins of the famous castle of Hapsburg.

SCHINUS, in botany, a genus of the class dioecia, order decandria. Calyx five-cleft; petals five. Fem.: styleless; stigmas three; berry three-celled. Two species.

1. S. molle. Peruvian mastich or lentisk-tree. Leaves pinnate; leaflets serrate, the terminal one long. Rises with a woody stem eight or ten feet high, dividing into many branches, covered with a brown rough bark. Flowers produced in loose bunches at the end of the branches, small, white, and odourless. A native of Peru.

2. S. areira. Brasilian mastich tree. Leaves pinnate; leaflets quite entire. In all other respects like the last. A native of Brazil and Peru. Both are propagated by seeds obtained from their native soil, sown in pots plunged into a moderate hot-bed: the last requires to be continued in the stove for several winters before it can be entrusted to the green-house. They are both shrubby evergreens.

SCHIRAS, a famous city of Persia, in Farsistan, and the capital of all Persia. It is three miles in length, but not so much in breadth; and is seated at the end of a spacious plain, surrounded by high hills, under one of which the town stands. The houses are built of bricks dried in the sun; the roofs are flat and terraced. There are 15 handsome mosques, tiled with stones of a bluish green colour, and lined within with black polished marble. There are many large and beautiful gardens, surrounded by walls 14 feet high, containing various kinds of fine trees, with fruits almost of every kind. The wines of Schiras are not only the best in Persia, but, some think, in the whole world. In 1778, the seat of government was transferred from Ispahan to this place. It is 225 miles S. of Ispahan. Lon. 54. 20 E. Lat. 29. 40 N.

SCHIRRUS. (σκιρρος; from σκιρροω, to harden.) A genus of diseases in the class locales and order tumores of Cullen; known by a hard tumor of a glandular part, indolent, and not readily suppurating. The following observations of Mr. Pearson are deserving of attention. A schirrus, he says, is usually defined to be a hard, and almost insensible tumor, commonly situated in a glandular part, and accompanied with little or no discolouration of the surface of the skin. This description agrees with the true or exquisite schirrus; but when it has proceeded from the indolent to the malignant state, the tumour is then unequal in its figure, it becomes painful, the skin acquires a purple or livid hue, and the cutaneous veins are often varicose. Let us now examine whether this enumeration of symptoms be sufficiently accurate for practical purposes.

With respect to a glandular part, it is probable, that any gland in the living body may be the seat of a cancerous disease; but it appears more frequently as an idiopathic affection in those glands that form the several secretions than in the absorbent glands: and of the secreting organs, those which separate fluids that are to be employed in the animal economy suffer much oftener than the glands which secrete the excrementitious parts of the blood. Indeed, it may be doubted whether an absorbent gland be ever the primary seat of a true schirrus. Daily experience evinces, that these glands may suffer contamination from their connection with a cancerous part; but under such circumstances, this morbid alteration being the effect of a disease in that neighbouring part, it ought to be regarded as a secondary or consequent affection. I have never yet met with an unequivocal proof of a primary schirrus in an absorbent gland; and if a larger experience shall confirm this observation, and establish it as a general rule, it will afford material assistance in forming the diagnosis of this disease. The general term schirrus hath been applied, with too little discrimination, to indurated tumors of lymphatic glands. When these appendages of the absorbent system enlarge in the early part of life, the disease is commonly treated as strumous; but as a similar alteration of these parts may, and often does occur at a more advanced period, there ought to be some very good reasons for ascribing malignity to one rather than the other. In old people the tumor is indeed often larger, more indurated, and less tractable than in children; but when the alteration originated in the lymphatic glands, it will very rarely be found to possess any thing cancerous in its nature.

If every other morbid alteration in a part were attended with pain and softness, then induration and defective sensibility might point out the presence of a schirrus. But this is so far from being the case, that even encysted tumors, at their commencement, frequently excite the sensation of impenetrable hardness. All glands are contained in capsulæ not very elastic, so that almost every species of chronic enlargement of these bodies must be hard; hence this induration is rather owing to the structure of the part, than to the peculiar nature of the disease: and as glands in their healthy state are not endowed with much sensibility, every disease that gradually produces induration will rather diminish than increase their perceptive powers. Induration and insensibility may therefore prove that the affected part does not labour under an acute disease; but these symptoms alone can yield no certain information concerning the true nature of the morbid alteration. Those indolent affections of the glands that so frequently appear after the meridian of life, commonly manifest a hardness and want of sensation not inferior to that which accompanies a true schirrus; and yet these tumors will often admit of a cure by the same mode of treatment which we find to be successful in scrophula; and when they prove unconquerable by the powers of medicine, we generally see them continue stationary and innocent to the latest period of life. Writers have, indeed, said much about certain tumors changing their nature, and assuming a new character; but I strongly suspect that the doctrine of the mutation of diseases into each other stands upon a very uncertain foundation. Improper treatment may, without doubt, exasperate diseases, and render a complaint which appeared to be mild and tractable dangerous or destructive; but to aggravate the symptoms, and to change the form of the disease, are things that ought not to be confounded. I do not affirm, that a breast which has been the seat of a mammary abscess or a gland that has been affected with scrophula may not become cancerous; for they might have suffered from this disease had no previous complaint

existed; but these morbid alterations generate no greater tendency to cancer than if the parts had always retained their natural condition. There is no necessary connection between the cancer and any other disease, nor has it ever been clearly proved that one is convertible into the other.

Chirurgical writers have generally enumerated tumor as an essential symptom of the schirrus; and it is very true, that this disease is often accompanied with an increase of bulk in the part affected. From long and careful observation, I am however induced to think that an addition to the quantity of matter is rather an accidental than a necessary consequence of the presence of this peculiar affection.

When the breast is the seat of a schirrus, the altered part is hard, perhaps unequal in its figure, and definite; but these symptoms are not always connected with an actual increase in the dimensions of the breast. On the contrary, the true schirrus is frequently accompanied with a contraction and diminution of bulk, a retraction of the nipple, and a puckered state of the skin.

The irritation produced by an indurated substance lying in the breast will very often cause a determination of blood to that organ, and a consequent enlargement of it; but I consider this as an inflammatory state of the surrounding parts, excited by the schirrus, acting as a remote cause, and by no means essential to the original complaint. From the evident utility of topical blood-letting under these circumstances, a notion has prevailed, that the schirrus is an inflammatory disease; but the strongly marked dissimilarity of a phlegmon and an exquisite schirrus, in their appearances, progress, and mode of termination, obliges me to dissent from that opinion. That one portion of the breast may be in a schirrous state, while the other parts are in a state of inflammation, is agreeable to reason and experience; but that an inflammation, which is an acute disease, and a schirrus, whose essential characters are almost directly the reverse of inflammation, shall be co-existent in the same part, is not a very intelligible proposition. Tumor and inflammation are commonly met with on a variety of other occasions, and in this particular instance they may be the effects of the disease, but are not essentially connected with its presence.

An incipient schirrus is seldom accompanied with a discolouration of the skin; and a dusky redness, purple, or even livid appearance of the surface, is commonly seen when there is a malignant schirrus. The presence or absence of colour can, however, at the best, afford us but a very precarious criterion of the true nature of the complaint. When the disease is clearly known, an altered state of the skin may assist us in judging of the progress it has made; but as the skin may suffer similar variations in a number of very dissimilar diseases, it would be improper to found an opinion upon so delusive a phænomenon.

SCHISM, *schisma*, formed from σχισμα, cleft, fissure, in the general, signifies division, or separation; but it is chiefly used in speaking of separations happening through diversity of opinions among people of the same religion and faith.

Thus, we say the schism of the ten tribes of Israel from the two tribes of Judah and Benjamin; the schism of the Persians from the Turks and other Mahometans, &c. Among ecclesiastical authors, the great schism of the West is that which happened in the times of Urban VI. and Clement VII. who were both advanced to the papacy at the same time, the latter residing at Avignon in France, and the former at Rome, which divided the church for forty or fifty years; the cause of Clement being espoused by France and Spain, Scotland, Sicily, and Cyprus, while the rest of Europe acknowledged Urban to be the true vicar of Christ; and was at length ended by the election of Martin V. at the council of Constance, summoned to meet in the year 1414.

The Romanists number thirty-four schisms in their church. They bestow the name English schism on the reformation of religion in this kingdom. Those of the church of England, again, apply the term schism to the separation of the non-conformists; viz. the Presbyterians, Independents, and Baptists, who contend for a farther reformation.

Some call the separation of the Protestants from the church of Rome a passive schism; because that church cut them off from her communion.

The word schism is used, in scripture, in an indifferent sense; and, therefore, the lawfulness or unlawfulness of it is entirely to be determined by circumstances. In our own language, indeed, common use has affixed to the term an idea of guilt and reproach: but in this sense there can be no such thing as schism, except in cases where there is an obligation to unity and communion: so that in order to define the nature of it justly, we must find out some centre of union, which is common to all Christians. This must be either uniformity of sentiment in matters of speculative belief, or in external modes of worship and discipline, which, in the nature of things, is impossible; or, if it be unreasonable to expect either of these, the only centre of unity that remains, is charity and mutual forbearance, notwithstanding lesser differences, where there is an assent to all the necessary principles of Christian faith, and the profession of Christianity is proved to be sincere by a regular and virtuous life. However numerous the differences that subsist among Christians, as long as mutual charity is preserved, there cannot be the guilt of schism. Alienation of affection, and a turbulent excommunicating spirit, are the essence of schism, and not mere difference of opinion; not the use of different ceremonies, or of no ceremonies at all; or joining ourselves to any particular religious communion: for, according to St. Paul, who in several passages blames the Corinthians for divisions, or

schisms, among themselves in the same community, this crime may be committed where there is no separation from a particular church; and, consequently, they that differ uncharitably, whether they belong all to one, or form distinct worshipping assemblies (and they alone), are schismatics.

Mr. Locke, when writing on this subject, sets out with remarking, that men of different religions cannot be either heretics or schismatics to one another. We are to enquire, therefore, says he, what men are of the same religion; concerning which it is manifest, that those who have one and the same rule of faith and worship are of the same religion; and those who have not the same rule of faith and worship are of different religions. For, since all things which belong to that religion are contained in that rule, it follows necessarily, that those who agree in one rule are of one and the same religion, and *vice versa*. Thus Turks and Christians are of different religions; because these take the Holy Scriptures to be the rule of their religion, and those the Koran. And for the same reason there may be different religions even among Christians. The Papists and the Lutherans, though both of them profess faith in Christ, and are therefore called Christians, yet are not both of the same religion; because these acknowledge nothing but the Holy Scriptures to be the rule and foundation of their religion; those take in also traditions and the decrees of popes, and of all these together make the rule of their religion. And thus the Christians of St. John (as they are called), and the Christians of Geneva, are of different religions; because these also take only the scriptures, and those, we know not what traditions, for the rule of their religion.

This being settled, it follows, first, that heresy is a separation made in ecclesiastical communion between men of the same religion, for some opinions no way contained in the rule itself. And, 2dly, that amongst those who acknowledge nothing but the Holy Scriptures to be their rule of faith, heresy is a separation made in their Christian communion, for opinions not contained in the express words of Scripture Now this separation may be made in a twofold manner.

1. When the greater part, or (by the magistrate's patronage) the stronger part, of the church separates itself from others, by excluding them out of her communion, because they will not profess their belief of certain opinions which are not to be found in the express words of scripture. For it is not the paucity of those that are separated, nor the authority of the magistrate, that can make any man guilty of heresy. But he only is a heretic who divides the church into parts, introduces names and marks of distinction, and voluntarily makes a separation because of such opinions.

2. When any one separates himself from the church, because that church does not publicly profess some certain opinions which the Holy Scriptures do not expressly teach.

Both these are heretics: because they err in fundamentals, and they err obstinately against knowledge. For, when they have determined the Holy Scriptures to be the only foundation of faith, they nevertheless lay down certain propositions as fundamental, which are not in the scripture; and because others will not acknowledge these additional opinions of theirs, nor build upon them as if they were necessary and fundamental, they therefore make a separation in the church; either by withdrawing themselves from the others, or expelling the others from them. Nor does it signify any thing for them to say, that their confessions and symbols are agreeable to scripture and to the analogy of faith. For if they be conceived in the express words of scripture, there can be no question about them; because these are acknowledged by all Christians to be of divine inspiration, and therefore fundamental. But if they say that the articles which they require to be professed are consequences deduced from the scripture, it is undoubtedly well done of them to believe and profess such things as seem unto them so agreeable to the rule of faith: but it would be very ill done to obtrude those things upon others, unto whom they do not seem to be the indubitable doctrines of scripture. And to make a separation for such things as these, which neither are nor can be fundamental, is to become heretics. For I do not think there is any man arrived to that degree of madness, as that he dare give out his consequences and interpretations of scripture as divine inspirations, and compare the articles of faith that he has framed according to his own fancy, with the authority of scripture. I know there are some propositions so evidently agreeable to scripture, that nobody can deny them to be drawn from thence; but about those, therefore, there can be no difference. This only I say, that however clearly we may think this or the other doctrine to be deduced from scripture, we ought not therefore to impose it upon others as a necessary article of faith, because we believe it to be agreeable to the rule of faith, unless we would be content also that other doctrines should be imposed upon us in the same manner.

Thus much concerning heresy; which word, in common use, is applied only to the doctrinal part of religion. Let us now consider schism, which is a crime near akin to it. For both these words seem to me to signify an ill-grounded separation in ecclesiastical communion, made about things not necessary. But since use, which is the supreme law in matters of language, has determined that heresy relates to errors in faith, and schism to those in worship or discipline, we must consider them under that distinction.

Schism then, for the same reasons that have already been alleged, is nothing else but a separation made in the communion of the church upon account of something in divine worship or ecclesiastical discipline, that is not any necessary part of it. Now, nothing in worship or discipline can be necessary to Christian communion, but what Christ our legisla-

tor, or the apostles, by inspiration of the Holy Spirit, have commanded in express words.

In fine: he that denies not any thing that the Holy Scriptures teach in express words, nor makes a separation upon occasion of any thing that is not manifestly contained in the sacred text, however he may be nicknamed by any sect of Christians, and declared, by some or all of them, to be utterly void of true Christianity, yet indeed and in truth this man cannot be either a heretic or a schismatic. (*Locke on Toleration.*)

SCHISMA, in music. Some, as Grassineau, make this interval equal to half a comma, and say that eighteen of them are required to make a complete tone, reckoning nine commas to a tone. But all this is inaccurate. See INTERVAL.

It is also used by some for the difference between the tones major and minor, called by others a comma. See COMMA.

SCHI'SMATIC. *s.* (from *schism.*) One who separates from the true church. See SCHISM.

SCHISMA'TICAL. *a.* (from *schismatic.*) Implying schism; practising schism (*King Charles*).

SCHISMA'TICALLY. *ad.* In a schismatical manner.

To SCHI'SMATIZE. *v. a.* (from *schism.*) To commit the crime of schism; to make a breach in the communion of the church.

SCHISTOSPATUM, in mineralogy, a genus of the class earths, order calcareous. Consisting of carbonat of lime, a larger proportion of carbonic acid gass and water; effervescing with acids; lamellar, with the foliations curved, parasitical, soft, breaking into indeterminate fragments, lightish, a little greasy to the touch; crackling in the fire. One species, S. fissile, argentine: plated spar: with the fibres curved or undulate. Found near Schwarkenburg and Konigsburg, in Saxony; in the Spara pit, in Norway; and near Kopmannificel, in Sweden, in irregular masses, and very brittle; colour reddish, greyish, or greenish-white, with a silvery greasy lustre, or similar to mother of pearl; sometimes opake or nearly so, rarely diaphonous; may be scratched with the nail; when heated to redness it turns reddish-brown, and at a degree of 155 is converted partly into a brown porcelane mass, partly into a reddish-brown glass. Mr. Kirwan supposes it to contain carbonat of lime, silica, and oxyd of iron.

SCHIST, or SCHISTUS, in mineralogy, an argillaceous earth, including most of the varieties of slate, for which see thearticle ARDESIA.

In the arrangement of Werner, who denominates the argillaceous slate thouschiefer, it consists of the three following species.

1. Common argillaceous schist. Colour smoke-grey, reddish, or blackish grey; sometimes also flesh red, reddish-brown, yellowish-brown, or olive-yellow. The colour is, for the most part, uniform, but it sometimes presents spots, bands, and dendridical delineations. It occurs in mass, disseminated, or in roundish fragments. Lustre silky or resinous, and varies from glimmering to slightly shining. Fracture slaty, generally straight, but sometimes curved or undulating. Some varieties are so compact as to present a dull, earthy fracture. Fragments tubular or rhomboidal, rarely large splintery. Varies from very soft to moderately hard, but even the hardest may readily be scratched by a knife. It is easily frangible, but not brittle; and gives a greyish-white streak. It is largely used for covering houses; and the straight foliated bluish grey varieties are employed as writing slates. The softer and more compact varieties are made into slate pencils.

2. Hone-slate. Novaculite of Kirwan. Colour greenish grey, or smoke-grey passing into olive and mountain-green. Occurs in mass, and has a glimmering lustre. It is cut into hones for sharpening the finer kinds of steel instruments. It occurs at Lauenstein in Bareith, at Seifendorf in Saxony, and the Levant, whence it is called Turkish-hone; also in the valley of Llanberris, in North Wales.

3. Black-chalk. Colour greyish or bluish-black. Occurs in mass; the longitudinal fracture slaty and glimmering, the cross fracture earthy and dull. Its fragments are tubular or splintery. It stains the fingers, and gives a somewhat glossy grey streak. It is employed for drawing and writing on paper and other materials. The best kinds come from Italy: it is also met with in Spain, France, Bareith, and the isle of Isla, in the Hebrides. Before the blow-pipe, without addition, it acquires a thin varnish, but does not melt. Its component parts, according to an analysis, by weight are

64·	- -	Silex
11·25	- -	Alumina
11·	- -	Carbon
2·75	- -	Oxyd of iron
7·5	- -	Water
96·5		

SCHIZÆA. In botany, a genus of the class cryptogamia, order filices. Fructification on the back of an appendage to the frond: involucres continued from the inflected margins of the appendage. Four species, all exotics.

SCHKUKRIA. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle naked; seeds crowned with five-leaved chaff; calyx five-leaved; florets of the margin solitary. One species only, a Mexican shrub, with erect, branched stem, and filiform, one-flowered peduncles.

SCHLECHTENDALIA. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle chaffy; seeds crowned with five erect awns; calyx double, the outer many-leaved, bristle-like; inner many-leaved, equal; florets of the center six or eight-cleft. One species only, a Mexican plant, with axillary one-flowered peduncles, the flowers scarlet.

SCHMIEDELIA. In botany, a genus of the class octandria, order digynia. Calyx two-

leaved; corol four-petalled; germs pedicelled, longer than the flower. One species only, an East Indian tree, with flexuous branches, alternate leaves, and simple axillary racemes.

SCHŒNANTHUS. See JUNCUS ODORATUS.

SCHŒNOBATES. (from the Greek σχοινος, a rope; and βαινω, I walk.) A name which the Greeks gave to their rope-dancers: by the Romans called *funambuli*. See ROPE-DANCER and FUNAMBULUS. The schœnobates were slaves whose masters made money of them, by entertaining the people with their feats of activity. Mercurialis de Arte Gymnastica, lib. iii. gives us five figures of schœnobates engraven after ancient stones.

SCHŒNUS. Bog-rush. In botany, a genus of the class triandria, order monogynia. Glumes chaffy, one-valved, clustered; corolless; seed one, rounded, among the glumes. Forty species, chiefly of the Cape; many of the West Indies and America; four indigenous to the bogs of our own country. The greater number have a round, the rest a three-sided culm.

SCHŒPFIA. In botany, a genus of the class pentandria, order monogynia. Corol campanulate; calyx double, the outer two-cleft, inferior; inner superior and very entire; stigma capitate; drupe one-seeded. One species only, an undershrub of Santa Cruz, with round branches, alternate, ovate leaves, and axiliary peduncles.

SCHOEPFLYN (John Daniel), a Lutheran divine, of Sulzbourg in Baden Dourlach. He studied at Basil and Strasburg, and was professor of eloquence and history in this last university. He received honourable invitations from the empress of Russia, from Sweden, from Leyden, and other learned bodies, but he preferred the tranquillity of Strasburg. In 1726 he quitted his professorship, and travelled at the public expence, and visited Italy, Paris, London, and other places. He died at Strasburg of a slow fever, 1771, aged 77. His works are Historia Zaringo-Badensis Carlsruhe, 7 vols. 4to.; Alsatia Diplomatica, 2 vols. fol.; Alsatia illustrata, 2 vols. folio; Alsaticarum rerum Scriptores, fol.; Vindiciæ Typographicæ, 4to. &c.

SCHO'LAR. *s.* (*scholaris*, Latin.) 1. One who learns of a master; a disciple (*Hooker*). 2. A man of letters (*Locke*). 3. A pedant; a man of books (*Bacon*). 4. One who has a lettered education (*Shakspeare*).

SCHO'LARSHIP. *s.* (from *scholar*.) 1. Learning; literature; knowledge (*Pope*). 2. Literary education (*Milton*). 3. Exhibition or maintenance for a scholar (*Ainsworth*).

SCHOLA'STICAL. *a.* (*scholasticus*, Lat.) Belonging to a scholar or school.

SCHOLA'STICALLY. *ad.* According to the niceties or method of the schools (*South*).

SCHOLA'STIC. *a.* (from *schola*, Lat.) 1. Pertaining to the school; practised in schools (*Burnet*). 2. Befitting the school; suitable to the school; pedantic (*Stillingfleet*).

SCHO'LIAST. *s.* (*scholiastes*, Latin.) A writer of explanatory notes (*Dryden*).

SCHOLIUM, σχολιον, a note, annotation, or remark, occasionally made on some passage, proposition, or the like.

The term is much used in geometry, and other parts of mathematics; where, after demonstrating a proposition, it is frequent to point out how it might be done some other way; or to give some advice or precaution, in order to prevent mistakes; or add some particular use or application thereof.

Wolfius has given us abundance of curious and useful arts and methods, and a good part of the modern philosophy, the description of mathematical instruments, &c. all by way of scholia to the respective propositions in his Elementa Matheseos.

SCHO'LY. *s.* (*scholie*, Fr. *scholium*, Latin.) An explanatory note (*Hooker*).

To SCHO'LY. *v. n.* (from the noun.) To write expositions (*Hooker*).

SCHOMBERG (Henry de), was governor of la Marche, and served under Charles IX. and his two successors. He died suddenly in 1599. His son of the same name succeeded at la Marche, and distinguished himself in Piedmont in 1617, under d'Estrées, and against the Huguenots, in 1622, for which he was made marshal of France. He contributed much, in 1625, to the defeat of the English at the isle of Rhé, and two years after he forced the passage of Suza, where he was severely wounded. In 1630 he made himself master of Pignerol, and relieved Casal, and soon after defeated the rebels in Languedoc, at Castelnaudari, where Montmorenci was wounded and taken prisoner. He died the next year of an apoplexy, aged 49. He was ambassador for some time in England and Germany, and he wrote a relation of the war in Italy. His son Charles distinguished himself also in the service of France, and was made marshal of France. He conquered the Spaniards, and died at Paris 1656, aged 56.

SCHOMBERG (Frederic duke of), born in 1608. He served first in the army of the United Provinces, and became the confidant of William II. prince of Orange. He entered into the service of France, and as a general was ranked next to the great Condé and Turenne, being raised to the dignity of a marshal. He offered his services in 1659 to Charles II. in order to restore him to the throne of England; but France sent him to Lisbon against the Spaniards, and his conduct was so much approved of by the Portuguese, that they created him a grandee, with a pension of 5000*l*. On the revocation of the edict of Nantes he quitted France, and after visiting different countries, he settled in Brandenburg; but when the prince of Orange was preparing his expedition, he entered into his service, and accompanied him. At the Revolution he was naturalized, and created knight of the garter, and soon after he was made an English peer, by the title of the duke of Schomberg. The house of commons also voted him 100,000*l*. He was sent with a force to reduce Ireland, where by a misdirected but fatal shot, from a French regiment of refugee protestants in his own army, he was killed, and buried in St. Patrick's cathedral, Dublin.

SCHOOL. *s.* (*schola*, Latin.) 1. A house of discipline and instruction (*Dryden*). 2. A place of literary education (*Digby*). 3. A state of instruction (*Dryden*). 4. System of doctrine as delivered by particular teachers (*Taylor*). 5. The age of the church, and form of theology succeeding that of the fathers.

To SCHOOL. *v. a.* (from the noun.) 1. To instruct; to train (*Spenser*). 2. To teach with superiority; to tutor (*Dryden*).

SCHOOL, a public place, wherein the languages, the arts, or sciences, are taught. Thus we say, a grammar school, a writing school, a Sunday school, a charity school, a Lancasterian school, a national school, a school of natural philosophy, &c.—The word is formed from the Latin *schola*, which, according to Du Cange, signifies discipline and correction; he adds, that it was anciently used, in general, for all places where several persons met together, either to study, to converse, or do any other matter. Accordingly there were *scholæ palatinæ*, being the several posts wherein the emperor's guards were placed; *schola scutatiorum*, *schola gentilium*, &c. At length the term passed also to civil magistrates; and accordingly in the code we meet with *schola chartulariorum*, *schola agentium*, &c.; and even to ecclesiastics, as *schola cantorum*, *schola sacerdotum*, &c.

The Hebrews were always very diligent to teach and study the laws that they had received from Moses. The father of the family studied and taught them in his own family. The Rabbin taught them in the temple, in the synagogues, and in the academies. They pretend that even before the deluge there were schools for knowledge and piety, of which the patriarchs had the direction. They place Adam at their head, then Enoch, and lastly Noah. Melchisedec, as they say, kept a school in the city of Kajrath-sepher, otherwise Hebron, in Palestine. Abraham, who had been instructed by Heber, taught in Chaldea and Egypt. From him the Egyptians learned astronomy and arithmetic. Jacob succeeded Abraham in the office of teaching. The scripture says he was "a plain man dwelling in tents;" which, according to the Chaldee paraphrast, is, "that he was a perfect man, and a minister of the house of doctrine."

All this, indeed, must be very precarious and uncertain. It cannot be doubted but that Moses, Aaron, and the elders of Israel, instructed the people in the wilderness, and that many good Israelites were very industrious to instruct their families in the fear of God. But this does not prove to us that there were any such schools as we are now inquiring after. Under Joshua we see a kind of academy of the prophets, where the children of the prophets, that is, their disciples, lived in the exercise of a retired and austere life, in study, in the meditation and reading of the law of God. There were schools of the prophets at Naioth in Ramah; 1 Sam. xix. 12, 20, &c. See the article PROPHET.—These schools, or societies of the prophets, were succeeded by the synagogues. See the article SYNAGOGUE.

SCHO'OLBOY. *s.* (*school* and *boy*.) A boy that is in his rudiments at school (*Swift*).

SCHO'OLDAY. *s.* (*school* and *day*.) Age in which youth is sent to school (*Shakspeare*).

SCHO'OLFELLOW. *s.* (*school* and *fellow*.) One bred at the same school (*Locke*).

SCHO'OLHOUSE. *s.* (*school* and *house*.) House of discipline and instruction (*Spenser*).

SCHO'OLMAN. *s.* (*school* and *man*.) 1. One versed in the niceties and subtilties of academical disputation (*Pope*). 2. A writer of scholastic divinity or philosophy (*Pope*).

SCHO'OLMASTER. *s.* (*school* and *master*.) One who presides and teaches in a school (*Bacon. South*).

SCHO'OLMISTRESS. *s.* (*school* and *mistress*.) A woman who governs a school (*Gay*).

SCHOONER, in sea language, a small vessel with two masts, whose main-sail and fore-sail are suspended from gaffs, reaching from the mast towards the stern, and stretched out below by booms, whose foremost ends are hooked to an iron, which clasps the mast, so as to turn therein as upon an axis, when the after-ends are swung from one side of the vessel to the other.

SCHORL, in mineralogy. See SCORLUS.

SCHOTIA, in botany, a genus of the class decandria, order monogynia. Calyx five-cleft; petals five, inserted into the calyx, and closed by the sides lapping over each other; legume pedicelled. One species only, a native of the Cape and of Senegal.

SCHOUSBŒA, in botany, a genus of the class decandria, order monogynia. Calyx campanulate, five-cleft, bearing the corol; petals five; berry five-angled, one-seeded; seed coated. One species only; a climbing shrub of Guiana, with terminal raceme and red calyx.

SCHRADERA, in botany, a genus of the class hexandria, order monogynia. Involucre general, many-flowered; calyx superior, pitcher-shaped; corol campanulate, five or six-cleft with a hairy throat; berry many-seeded. Two species: one a parasitical shrub of Montserrat: the other a parasite of Jamaica.

SCHWALBEA, in botany, a genus of the class didynamia, order angiospermia. Calyx four-cleft; the upper lip very small; lower lip very large and emarginate. One species only, a North American plant, with dark red, inclined corol.

SCHWEITZ, a canton of Swisserland, bounded on the W. by the Lake of the Four Cantons, on the S. by the canton of Uri, on the E. by that of Glarus, and on the N. by those of Zuric and Zug. This canton, with that of Uri and Underwalden, threw off the yoke of Austria in 1308; and formed a perpetual alliance in 1315, which was the grand foundation of the Helvetic confederacy. The name of Schweitzerland, Switzerland, or Swisserland, which originally comprehended only these three cantons, was afterward extended to all Helvetia. It derived that appellation, either from the canton of Schweitz, as being the most

distinguished by the revolution of 1308, or because the Austrians called all the inhabitants of these mountainous parts by the general denomination of Schweitzers. The government of Schweitz and Uri till lately were entirely democratical. They contain, including their subjects, 50,000 souls; and, in case of necessity, could furnish above 12,000 militia. The same kind of soil, and the same productions, are common to the two cantons. The whole country being rugged and mountainous, consists chiefly of pasture, raises little corn, and has no wine: but this soil, naturally barren, has been improved by the natives to a great degree of fertility. Luxury is scarcely known in these cantons; and a purity of morals prevails, which can scarcely be imagined by the inhabitants of great and opulent cities. The Roman catholic religion is here exclusively established.

SCHWEITZ, a town of Swisserland, capital of the canton of that name, seated near the Waldstætter See, on the slope of a hill, and at the bottom of two high, sharp, and rugged rocks, called the Schweitzer Haken. The church is a large magnificent building. It is 10 miles S.E. of Lucern. Lon. 8. 30 E. Lat. 46. 55 N.

SCHWEITZ (Lake of). See WALDSTÆTTER SEE.

SCHWENKFELDIA, in botany, a genus of the class pentandria, order monogynia. Involucre four-cleft; corol salver-shaped; stigma five-parted; berry five-celled, many-seeded. Three species, natives of the West Indies or South America, with hoary leaves, and peduncled or sessile flowers.

SCHWENKIA, in botany, a genus of the class diandria, order monogynia. Corol nearly equal, with a plaited, glandular throat; stamens three, barren; capsule two-celled, many-seeded. One species only, a Guiana plant.

SCIÆNA, in zoology, a genus of the class pisces, order thoracica. Head covered with scales; scales strongly fixed; gill-membrane with about six rays; the covers scaly; dorsal fins two, frequently concealed in a longitudinal cavity. Thirty species; one or two inhabitants of the Mediterranean, the rest of the Arabian seas.

The fishes of this tribe have their scales very minute, smooth, and towards the back and belly raised and loose: jaws of unequal length, furnished with a great number of sharp, incurvated teeth, that are covered by two thick lips: a single dorsal and anal fin, with a loose appendage beyond the rays: ventral fins placed on the thorax, a little behind the pectoral, and sharpened at the point. A great part of the fishes belonging to this genus are black, and have obtained the names of sea-crows, ravens, and umbres, from the old naturalists.

The following are chiefly worthy of notice.

1. S. umbra. Sea-crow, or umbre. Of a black colour, in shape resembling a perch; ventral and anal fins black, as if dyed with ink; back variegated with undulating lines, of dark brown and blue: snout sharp; mouth capacious, and instead of teeth is roughened with small asperities: around the rostrum various small apertures; those of the nostrils wide, and placed near the eyes. On the back two fins, so closely adjoining, that they appear single and contiguous. The umbre is caught in the Mediterranean, and sold in the markets of Rome, where it is called ombrino.

2. S. strideus. Silvery-blue, with from three to five brown longitudinal lines on each side. Inhabits Arabia; a span long; feeds on herbs, and when first taken out of the water utters a small shriek.

SCIATIC ARTERY. Ischiatic artery. A branch of the internal iliac.

SCIATIC NERVE. Ischiatic nerve. A branch of a nerve of the lower extremity, formed by the union of the lumbar and sacral nerves. It is divided near the popliteal cavity into the tibial and peroneal, which are distributed to the leg and foot.

SCIATIC NOTCH. Ischiatic notch. See INNOMINATUM OS.

SCIATICA. Ischias. A rheumatic affection of the hip-joint.

SCIENCE, in philosophy, denotes any doctrines deduced from self-evident principles. Sciences may be properly divided as follows. 1. The knowledge of things, their constitutions, properties, and operations: this, in a little more enlarged sense of the word, may be called Φυσικη, or natural philosophy; the end of which is speculative truth. See PHILOSOPHY and PHYSICS. 2. The skill of rightly applying these powers, πρακτικη. The most considerable under this head is ethics, which is the seeking out those rules and measures of human actions that lead to happiness, and the means to practise them (see MORAL PHILOSOPHY); and the next is mechanics, or the application of the powers of natural agents to the uses of life (see MECHANICS).—3. The doctrine of signs, σημειωτικη; the most usual of which being words, it is aptly enough termed logic. See LOGIC. "This, (says Mr. Locke,) seems to be the most general as well as natural division of the objects of our understanding.—For a man can employ his thoughts about nothing but either the contemplation of things themselves for the discovery of truth; or about the things in his own power, which are his actions, for the attainment of his own ends; or the signs the mind makes use of both in the one and the other, and the right ordering of them for its clearer information. All which three, viz. things as they are in themselves knowable, actions as they depend on us in order to happiness, and the right use of signs in order to knowledge, being *toto cœlo* different, they seem to be the three great provinces of the intellectual world, wholly separate and distinct one from another."

For the difference between art and science, see ART.

The most usual acceptations of the word science, are as below:

SCI'ENCE. *s.* (*science*, Fr. *scientia*, Lat.) 1.

Knowledge (*Hammond*). 2. Certainty grounded on demonstration (*Berkley*). 3. Art attained by precepts, or built on principles (*Dryd.*). 4. Any art or species of knowledge (*Shaks.*). 5. One of the seven liberal arts, grammar, rhetoric, logic, arithmetic, music, geometry, astronomy (*Pope*).

SCIE'NTIAL. *a.* (from *science.*) Producing science (*Milton*).

SCIENTI'FICAL. SCIENTI'FIC. *a.* (*scientifique*, Fr. *scientia* and *facio*, Lat.) Producing demonstrative knowledge; producing certainty (*South*).

SCIENTI'FICALLY. *ad.* In such a manner as to produce knowledge (*Locke*).

SCILLA. Squill. In botany, a genus of the class hexandria, order monogynia. Corol six-petalled, spreading; filaments filiform; capsule superior, three-celled; seeds rounded; calyxless. Seventeen species, chiefly natives of the South of Europe, a few of Japan, and Africa: four indigenous to the groves, rocks, pastures, or thickets of our own country. The following are cultivated.

1. S. lilio. Hyacinthus. Lily-rooted squill. Hyacinth-lily. Raceme few-flowered; peduncles without bractes; leaves lanceolate, pressed to the ground; bulb scaly. Flower-stalk issuing from a many-tunic bulb, rising two feet, and terminated by a pyramidal thyrse of blue flowers.

2. S. Italica. Italian squill, with a lily root, and white flowers.

3. S. Peruviana. Peruvian squill. Solid root, and conical corymb of flowers.

4. S. amæna. Nodding squill. Angular scape, violet-blue flowers.

5. S. campanulata. Spanish squill. Bulb solid; corol campanulate on a scape nine or ten inches high; petals deep violet blue.

6. S. autumnalis. Autumnal squill. Leaves linear; peduncles ascending as long as the flowers.

7. S. nutans. Hare-bell. Leaves linear, spike nodding; flowers drooping, campanulate; bractes in pairs.

8. S. maritima. Officinal squill. Flowers naked; bractes refracted; root coated; scape flowering before the appearance of leaves; flowers white. The root of this last, which appears to have been known as a medicine in the early ages of Greece, and has so well maintained its character ever since as to be deservedly in great estimation, and of very frequent use at this time, seems to manifest a poisonous quality to several animals. In proof of this we have the testimonies of Hillefield, Bergius, Vogel, and others. Its acrimony is so great, that even if much handled it exulcerates the skin, and if given in large doses, and frequently repeated, it not only excites nausea, tormina, and violent vomiting, but it has been known to produce strangury, bloody urine, hypercatharsis, cardialgia, hæmorrhoids, convulsions, with fatal inflammation, and gangrene of the stomach and bowels. But as many of the active articles of the materia medica, by injudicious administration, become equally deleterious, these effects of the scilla do not derogate from its medicinal virtues; on the contrary, we feel ourselves fully warranted in representing this drug, under proper management, and in certain cases and constitutions, to be a medicine of great practical utility, and real importance in the cure of many obstinate diseases. Its effects, as stated by Bergius, are incidens, diuretica, emetica, subpurgans, hydrogoga, expectorans, emmenagoga. In hydropsical cases it has long been esteemed the most certain and effectual diuretic with which we are acquainted; and in asthmatic affections, or dyspnœa, occasioned by the lodgment of tenaceous phlegm, it has been the expectorant usually employed. The squill, especially in large doses, is apt to stimulate the stomach, and to prove emetic; and it sometimes acts on the intestines, and becomes purgative; but when these operations take place, the medicine is prevented from reaching the blood vessels and kidneys, and the patient is deprived of its diuretic effects, which are to be obtained by giving the squill in smaller doses, repeated at more distant intervals, or by the joining of an opiate to this medicine, which was found by Dr. Cullen to answer the same purpose. The Doctor further observes, that from a continued repetition of the squill, the dose may be gradually increased, and the intervals of its exhibitions shortened; and when in this way the doses come to be tolerably large, the opiate may be most conveniently employed to direct the operation of the squill more certainly to the kidneys. "In cases of dropsy, that is, when there is an effusion of water into the cavities, and therefore that less water goes to the kidneys, we are of opinion that neutral salt, accompanying the squill, may be of use in determining this fluid more certainly to the kidneys; and whenever it can be perceived that it takes this course, we are persuaded that it will be always useful, and generally safe, during the exhibition of the squills, to increase the usual quantity of drink."

The diuretic effects of squills have been supposed to be promoted by the addition of some mercurial; and the less purgative preparations of mercury, in the opinion of Dr. Cullen, are best adapted to this purpose; he therefore recommends a solution of corrosive sublimate, as being more proper than any other, because most diuretic. Where the primæ viæ abound with mucous matter, and the lungs are oppressed with viscid phlegm, this medicine is likewise in general estimation.

As an expectorant, the squill may be supposed not only to attenuate the mucous follicles to excite a more copious excretion of it from the lungs, and thereby lessen the congestion, upon which the difficulty of respiration very generally depends. Therefore in all pulmonic affections, excepting only those of actual or violent inflammation, ulcer, and spasm, the squill has been experienced to be an useful medicine. The officinal preparations of squills are, a conserve, dried squills, a syrup and vinegar, an oxymel, and pills. Practitioners have not, however, confined themselves to these. When this root was intended as a diuretic, it has most com-

monly been used in powder, as being in this state less disposed to nauseate the stomach; and to the powder it has been the practice to add neutral salts, as nitre, or crystals of tartar, especially if the patient complained of much thirst; others recommend calomel; and with a view to render the squills less offensive to the stomach, it has been usual to conjoin an aromatic. The dose of dried squill is from two to four or six grains once a day, or half this quantity twice a day; afterwards to be regulated according to its effects. The dose of the other preparations of this drug, when fresh, should be four times this weight; for this root loses in the process of drying four-fifths of its original weight, and this loss is merely a watery exhalation. See BOTANY, Pl. CXLV.

SCILLONEORTE, Σκιλλων Ἑορτη, in antiquity, the festival of sea-onions. It was observed in Sicily. The chief part of it was a combat, wherein youths beat one another with sea-onions. He that obtained the victory was rewarded by the gymnasiarch with a bull.

SCILLY, a cluster of islands and rocks, lying almost 10 leagues W. of the Land's End, in Cornwall, and are easily discerned from it. Of these only six are inhabited. They are supposed formerly to have produced much tin, but are now chiefly known as a resort for sea-fowl, and a place of shelter for ships in bad weather. The inhabitants principally subsist by fishing, burning kelp, and acting as pilots. The chief of the islands is St. Mary's, which has a good port, is the best cultivated, and contains more inhabitants than all the rest put together. In this island, and in two or three others, are various antiquities, particularly the remains of a temple of the Druids, and ancient sepulchres; but the greatest ornament is the lighthouse, which with the gallery is 51 feet high, and a very fine column. The Scilly rocks have been fatal to numbers of ships entering the English Channel. One of the most disastrous events of this kind happened in 1707, when admiral sir Cloudesley Shovel, with three men of war, perished with all their crews. Lon. 6. 46 W. Lat. 49. 56 N.

These islands have been recently purchased for his Royal Highness the Prince of Wales. The population in 1808 was as follows:

	Males.	Females.	
St. Mary's	546	619	
Trescow	197	214	
St. Agnes	101	114	
St Martin's	94	112	
Bryer	48	42	
Sampson's	16	17	
	1002	1118	Total 2120.

SCILLY, a group of isles or shoals in the Pacific ocean, discovered by Captain Wallis in 1767, and described as extremely dangerous. Lon. 155. 30 W. Lat. 16. 30 S.

SCI'MITAR. *s.* A short sword with a convex edge; a cimeter (*Shakspeare*).

SCIMPODIUM, Σκιμποδιον, among the ancients, a small couch or bed, on which one person only could rest at a time. It was on the scimpodium that the Romans used to lay themselves when weary or indisposed.

SCINK. *s.* A cast calf (*Ainsworth*).

To SCI'NTILLATE. *v. n.* (*scintillo*, Lat.) To sparkle; to emit sparks.

SCINTILLA'TION. *s.* (*scintillatio*, Lat. from *scintillate.*) The act of sparkling; sparks emitted (*Brown*).

SCIO, anciently called Chios, an island of the Archipelago, near the coast of Natolia, N.W. of Samos. It is 36 miles long and 13 broad, and a mountainous country; yet fruits of various kinds grow in the fields; such as oranges, citrons, olives, mulberries, and pomegranates, interspersed with myrtles and jasmines. The wine of Scio, so celebrated by the ancients, is still in great esteem; but the island is now principally distinguished by the profitable culture of mastich: it has also some trade in silk, cotton, and figs. It is computed that there are 4000 Turks, 100,000 Greeks, and 2000 Latins on this island. The Turks took it from the Genoese in 1566. Besides the town of the same name, it contains 68 villages, all inhabited by Greeks; and those which furnish mastich are the most rich and populous.

SCIO, a seaport and the capital of an island of the same name, and a bishop's see. It is the best built town in the Archipelago; the houses being commodious, some of them terraced, and others covered with tiles. The castle is an old citadel built by the Genoese, in which the Turks have a garrison. The harbour is a rendezvous for ships, that go to or come from Constantinople: it will contain 80 vessels, is protected by a low mole, and has two lighthouses. It stands on the E. side of the island, 67 miles W. of Smyrna. Lon. 26. 2 E. Lat. 38. 28 N.

SCI'OLIST. *s.* (*sciolus*, Lat.) One who knows many things superficially (*Glanville*).

SCI'OLOUS. *a.* (*sciolus*, Lat.) Superficially or imperfectly knowing: not used (*Howel*).

SCI'OMACHY. *s.* (σκια and μαχη.) Battle with a shadow (*Cowley*).

SCI'ON. *s.* (*scion*, French.) A small twig taken from one tree to be ingrafted into another (*Shakspeare*).

SCIOPPIUS (Gaspar), born in the upper palatinate, in 1576, who so early as at 16, had the reputation of being a good author. He is, however, represented as a very bad man, and was certainly of a spiteful disposition, and given to slander. He was nicknamed the Grammatical Cur. His slander did not spare the best writers of Rome, not Cicero himself, whom he accuses of improprieties and barbarisms. This extraordinary person went from Altdorf, where he last studied, to Verona, in Italy, and published at Ferara a panegyric upon the king of Spain, and pope Clement VIII. He turned Roman catholic, and wrote numerous treatises under fictitious names against the Jesuists. He wrote also against the protestants, but afterwards returned to their communion, and died in 1649.

Scilla Serratina.
Pink late-flowering Squill.

Scilla Hyacinthoides.
Hyacinth Squill.



London, Published by Sherwood & Co. Paternoster Row. Feb.y 1.st 1812.

SCIOPTIC, a sphere, or globe of wood, with a circular hole or perforation, wherein a lens is placed. It is so fitted that, like the eye of an animal, it may be turned round every way, to be used in making experiments in a darkened room.

SCIPIO, a celebrated family at Rome, who obtained the greatest honours in the republic. The name seems to be derived from *scipio*, which signifies a stick, because one of the family had conducted his blind father, and had been to him as a stick. The Scipios were a branch of the Cornelian family. The most illustrious were—1. Cn. sirnamed Asina, who was consul A. U. C. 492 and 498. He was conquered in his first consulship in a naval battle, and lost 17 ships. The following year he took Aleria, in Corsica, and defeated Hanno, the Carthaginian general in Sardinia. He also took 200 of the enemy's ships, and the city of Panormum, in Sicily. He was father to Publius and Cneus Scipio, who were defeated and killed in battle by the Carthaginians, in Spain, under the command of the two Asdrubals and Mago.—2. Publius Cornelius, sirnamed Africanus, was son of Publius Scipio, who was killed in Spain. He first distinguished himself at the battle of Ticinus, where he saved his father's life. The battle of Cannæ, instead of disheartening Scipio, raised his expectations, and he no sooner heard that some of his desperate countrymen wished to abandon Italy, and to fly from the insolence of the conqueror, than with his sword in his hand, and by his firmness and example, he obliged them to swear eternal fidelity to Rome. In his 21st year, Scipio was made an edile, and some time after the defeat of his father, Publius, and his uncle Cneus, he was appointed to avenge the death of Scipio, in Spain, and to vindicate the military honour of the republic. It was soon known how able he was to be at the head of an army. Having arrived in Spain, he, in the space of four years, banished the Carthaginians from it, and made the whole province tributary to Rome; New Carthage submitted in one day, and in one battle 54,000 of the enemy were left dead on the field. After these signal victories Scipio was recalled to Rome, where he advised the invasion of Africa, as the only means of conquering Annibal; though opposed by the eloquence, age, and experience of the great Fabius, Scipio was impowered to conduct the war on the coasts of Africa. With the dignity of consul he embarked for Carthage. Success attended his arms, the Carthaginian armies were routed, the camp of Asdrubal was set on fire during the night, and his troops totally defeated in a drawn battle. These repeated losses alarmed Carthage, and Annibal was recalled from Italy, to defend the walls of his country, and the two greatest generals of that age met each other in the field. Terms of accommodation were proposed, but in vain. This celebrated battle was fought near Zama, and both generals displayed great military knowledge, courage, and intrepidity. The conqueror of Italy was, however, vanquished; about 20,000 Carthaginians were slain, and the same number made prisoners of war, B. C. 202. Only 2,000 of the Romans were killed. This battle was decisive; the Carthaginians sued for peace, which Scipio at last granted on the most humiliating terms. The conqueror, after his return to Rome, where he was received with the most unbounded applause, was honoured with a triumph, and dignified with the appellation of Africanus. Here he enjoyed for some time the honours which his exploits merited, but he afterwards had the mortification to see his services slighted. He retired from Rome, no longer to be a spectator of the ingratitude of his countrymen, and, in the capacity of lieutenant, he accompanied his brother against Antiochus, king of Syria. In this expedition his arms were attended with his usual success. At his return to Rome, Africanus found the malevolence of his enemies still unabated. Cato, and the Petilii, accused him of extortion in the provinces of Asia, and of living in an indolent and luxurious manner. This accusation was stopped, and the accusers were silenced. Some time after Scipio died at Liternum, the place of his retreat, about 184 years before Christ, in the 48th year of his age. If Scipio was robbed, during his lifetime, of the honours which belonged to him as conqueror of Africa, he was not forgotten when dead. The Romans viewed his character with reverence; with raptures they read of his warlike actions, and Africanus was regarded in the following ages as a pattern of virtue, of innocence, courage, and liberality. The friendship of Scipio and Lælius is well known.—3. Lucius Cornelius, sirnamed Asiaticus, accompanied his brother Africanus in his expeditions in Spain and Africa, and for his services to the state, he was empowered to attack Antiochus, king of Syria, who had declared war against the Romans. Lucius, by the advice of the conqueror of Annibal, soon routed the enemy, and, in a battle near the city of Sardes, he killed 50,000 foot and 4000 horse. The submission of Antiochus succeeded this victory, and the conqueror, at his return home, obtained a triumph, and the sirname of Asiaticus. He did not, however, long enjoy his prosperity; Cato, and the two Petilii, charged Asiaticus with having suffered himself to be corrupted by Antiochus. Being summoned before the tribunal of Terentius Culeo, he was found guilty, and his goods were confiscated. Scipio declared that he had accounted to the public for all the money which he had brought from Asia, and therefore that he was innocent. For this obstinacy Scipio was dragged to prison. The Romans, however, ashamed of their severity towards him, afterwards rewarded his merit with uncommon liberality.—4. Nasica, son of Cneus Scipio, and cousin to Scipio Africanus, distinguished himself by the active part he took in confuting the accusations laid against the two Scipios, Africanus and Asiaticus.—5. Publ. Æmilianus, son of Paulus, the conqueror of Perseus, was adopted by the son of Scipio Africanus. He received the same sirname as his grandfather, and was called Africanus the

younger, on account of his victories over Carthage. Under him the Roman army in the third Punic war laid siege to Carthage, and took it. He afterwards distinguished himself as a legionary tribune in the Spanish provinces, where he killed a Spaniard of gigantic stature, and obtained a mural crown at the siege of Intercatia. He next passed into Africa to demand a reinforcement from king Masinissa, the ally of Rome, and he was the spectator of a long and bloody battle, which was fought between that monarch and the Carthaginians, which soon produced the third Punic war. Being empowered by the Roman senate to conduct this war, the surrender of above 50,000 men was followed by the reduction of the citadel, and the total submission of Carthage, B. C. 147. The captive city was set on fire, and though Scipio was obliged to demolish its very walls to obey the orders of the Romans, yet he wept bitterly over the melancholy scene; and in bewailing the miseries of Carthage, he expressed his fears lest Rome, in her turn, in some future age, should exhibit such a dreadful conflagration. The return of Æmilianus to Rome was that of another conqueror of Annibal, and like him, he was honoured with a magnificent triumph, and received the sirname of Africanus. He was also called Numantinus, from his conquering Numantia. Scipio was found dead in his bed, and those who enquired for the causes of this sudden death perceived violent marks on his neck, and concluded that he had been strangled, B. C. 128, &c. The second Africanus has often been compared to the first of that name; they seemed to be equally great and equally meritorious, and the Romans were unable to distinguish which of the two was entitled to a greater share of their regard and admiration.

SCIRA, an annual solemnity observed at Athens, in honour of Minerva, or according to others, of Ceres and Proserpine. It received its name either from Sciras, a small town of Attica, or from a native of Eleusis, called Scirus.

SCIRE FACIAS, is a judicial writ, and properly lies after a year and a day after judgment given; whereby the sheriff is commanded to summon or give notice to the defendant, that he appear and shew cause why the plaintiff should not have execution. 1 Inst. 290. A scire facias is deemed a judicial writ, and founded on some matter of record, as judgments, recognizances, and letters patent, on which it lies to enforce the execution of them, or to vacate or set them aside; and though it is a judicial writ of execution, yet it is so far in nature of an original, that the defendant may plead to it, and is in that respect considered as an action; and therefore it is held, that a release of all actions, or a release of all executions, is a good bar to a scire facias. See Rol. Abr.

SCIRO, or SCIROS, an island of the Archipelago, to the W. of Metelin. It is 15 miles long and eight broad, and a mountainous country, but has no mines. The vines make the beauty of the island, and the wine is excellent; nor do the natives want corn or wood. It contains only the village and convent of St. George, both built on a conical rock, 10 miles from the harbour of St. George. Lon. 24. 38 E. Lat. 38. 54 N.

SCIROCHO, or SIROCHO, a name generally given in Italy to every unfavourable wind. In the south-west it is applied to the hot suffocating blasts from Africa, and in the north-east it means the cold bleak winds from the Alps.

SCIRON, a celebrated thief in Attica, who plundered the inhabitants of the country, and threw them down from the highest rocks into the sea, after he had obliged them to wait upon him, and to wash his feet. Theseus attacked him, and treated him as he treated travellers. According to Ovid, the earth, as well as the sea, refused to receive the bones of Sciron, which remained for some time suspended in the air, till they were changed into large rocks called Scironia Saxa, situate between Megara and Corinth.

SCIRPUS. Club-rush. In botany, a genus of the class triandria, order monogynia. Glumes chaffy, imbricate every way; corolless; one-seeded; mostly bearded. Sixty-seven species, chiefly natives of the Cape, or East or West Indies: nine common to the bogs, ditches, marshes, or sea-shores of our own country. They are thus subdivided:

A. Spike single.
B. Culm round, with numerous spikes.
C. Culm three-sided, panicle naked.
D. Culm three-sided, panicle leafy.
E. Culm three-sided, head terminal.
F. Culm quadrangular.

S. lacustris of this genus is the common bull-rush of our own rivers, with round, naked culm; panicle cymed, decompound, terminal; spiklets ovate.

SCIRRHO'SITY. *s.* (from *scirrhous.*) An induration of the glands (*Arbuthnot*).

SCI'RRHOUS. *a.* (from *schirrus.*) Having a gland indurated (*Wiseman*).

SCI'RRHUS. *s.* (*scirrhe*, Fr. from σκιρρος.) An indurated gland. See SCHIRRUS.

SCI'SSIBLE. *a.* (from *scissus*, Lat.) Capable of being divided smoothly by a sharp edge (*Bacon*).

SCI'SSILE. *a.* (*scissile*, Fr.; *scissilis*, Lat.) Capable of being cut or divided smoothly by a sharp edge (*Arbuthnot*).

SCI'SSION. *s.* (*scission*, Fr.; *scissio*, Lat.) The act of cutting (*Wiseman*).

SCI'SSOR. *s.* (from *scindo*, Lat.) A small pair of shears, or blades moveable on a pivot, and intercepting the thing to be cut (*Arbuth.*).

SCI'SSURE. *s.* (*scissum*, Lat.) A crack; a rent; a fissure (*Decay of Piety*).

SCITAMINEÆ. SCITAMINA. (*scitamentum, scitum edulium.*) An eatable of a racy flavour, pleasant spicy plants.) The name of the third order in Linnéus's Fragments; and of the eighth in his Natural Orders. In the Artificial System these are in the first class.

SCITAMENEOUS, of a spicy taste and odour.

SCIURIS, in botany, a genus of the class

diandria, order monogynia. Corol unequal, the upper lip three-cleft, lower bifid and shorter; stamens five, of which three are barren; capsules five, united, one-celled, one-seeded. One species only, a Guiana shrub, two feet high, with nodding axillary spikes.

SCIURUS. Squirrel. In zoology, a genus of the class mammalia, order glires. Fore-teeth two, upper wedged, lower acute; grinders upper, on each side five, lower four; clavicle perfect; tail shed on each side; whiskers long. These are usually active, elegant, easily tamed, climb dexterously, and leap from tree to tree: a few are subterraneous: they live mostly on seeds and fruits: some leap in running, some are furnished with a flying membrane. Body thickish; feet short; toes four with the rudiments of a thumb, five behind; head broad; ears long, oval; tail long, hairy, generally turned over the back. Thirty-eight species: thus subdivided.

A. Without flying membrane; climbers: thirty species.

B. With a flying membrane: eight species.

The following are the principal.

1. S. vulgaris. Common squirrel. Ears bearded at the tip; tail colour of the back: large, lively black eyes: head, body, legs, and tail of a bright reddish brown; breast and belly white; the hair on each side of its tail flat. In Sweden and Lapland, it changes its colour to grey in winter. In many parts of England there is a beautiful variety of this species, with milk-white tails.

This species inhabits Europe, the northern and temperate parts of Asia, and a variety of it is found as far south as the island of Ceylon. It is a neat, lively, active animal, lives always in the woods. In the spring, the female is seen pursued from tree to tree by the males, feigning an escape from their embraces. They make their nests of moss and dried leaves, in the fork of two branches, with two entrances to each, and stop up that on the side from which the wind blows. The female is gravid a month, and brings from three to seven young twice a year. They lay in a hoard of winter provisions; such as nuts, berries, and acorns. In summer, they feed on buds and young shoots, and are particularly fond of those of fir, and of the young cones. They sit up to eat, and use their fore-feet as hands. They cover themselves with their tail. They are remarkably agile, and leap to a surprising distance. When they are disposed to cross a river, a piece of bark serves each for a boat, and its own tail for a sail.

The grey squirrel of the Teleutian Tartars, near the river Oby, is as large again as the common grey squirrel, and is preferred to them on account of the silvery gloss of its skin.

A white variety is found common in Siberia, and a beautiful black variety about Lake Baikal.

The white-legged squirrel in the British Museum, said to have been brought from the island Ceylon, forms another variety: and by some writers is made a distinct genus. Its upper parts and its toes are of a reddish brown; its face and nose, the under side of its neck, its belly, fore-legs, and the inside of its ears and thighs, are white: the ears slightly tufted with black: tail long, and covered with dusky hairs, but much shorter than those of the European kind. The flesh of these animals is good; and their winter skins valuable. They are preyed upon by insect larves, serpents, and birds of prey.

2. S. macrourus. Ceylon squirrel.

3. S. Abyssinicus. Abyssinian squirrel.

We have joined these two in the same section, as Mr. Pennant seems to suspect that the latter may be only a variety of the former; and indeed it must be obvious that when naturalists describe species from single subjects, there is some danger of their multiplying the species from slight variations observable in different individuals belonging to the same species.

The Ceylon squirrel has its ears tufted with black; a flesh-coloured nose; cheeks, legs, and belly, of a pale yellow, with a yellow spot between its ears: forehead, sides, back, and haunches black; cheeks marked with a forked stroke of black; tail twice as long as the body, of a light grey, and very bushy. The part of it next the body quite surrounded with hair: on the rest the hairs separated and flat. It is thrice the size of the European squirrel.

The Abyssinian squirrel, described by Thevenot, is of the same size with that found in Ceylon; but he says that its belly and fore-feet are grey, and its soles were flesh-coloured: that it is very sportive and good-natured, like the common squirrel; eats any thing except flesh, and cracks the hardest almonds.

4. S. bicolor. Javan squirrel.

5. S. Indicus. Bombay squirrel.

6. S. erythræus. Ruddy squirrel.

As these three are all from the East Indies, they may be classed together. That of Java, discovered and briefly described by Sparman, is black on the upper part of the body, and brown on the lower: the end of its tail is black, and its thumb has a round nail. Though it inhabits Java, that of Ceylon and this are probably only varieties of the same species.

The Bombay squirrel has tufted ears too, but its upper parts are of a dull purple, its lower yellow, and the end of its tail orange. From nose to tail, it measures near sixteen inches; its tail seventeen.

The ruddy squirrel inhabits India: it is larger than the common squirrel; ears are slightly tufted; colour above yellow, mixed with dusky; below of a blood red, inclining to tawny: tail slender, of the same colour, marked lengthways with a black stripe: four toes on the fore-feet, with a remarkable protuberance instead of a thumb; and five toes on the hind feet.

7. S. cinereus. Grey squirrel. This is about the size of a half grown rabbit, and has plain ears: hair dull grey colour, mixed with black, and often tinged with dirty yellow: belly and the insides of its legs white; tail long, bushy, grey, and striped with black: inhabits the woods of North America, Peru, and Chili. In North America the individuals of this spe-

cies are very numerous, and do incredible damage to the plantations of maize, as they run up the stalks, and eat the young ears. Vast flocks of them descend from the mountains, and join those that inhabit the lower parts. They are proscribed by the provinces; and a reward of threepence a head is offered for every one that is killed. Such a number of them was destroyed in one year, that Pennsylvania alone paid in rewards 8000*l*. They make their nests in hollow trees, with moss, straw, wool, &c. Feed on the maize in its season, on pine cones, acorns, and mast of all kinds; form holes under ground, and there deposit a large stock of winter provision. They are particularly busy towards the approach of winter; but their stores are frequently plundered by the hogs. During the cold weather, they keep in their nests for several days together; and when the ground is covered with deep snow, they often perish for want of food. They seldom leap from tree to tree, but only run up and down their trunks. They are not easily shot, as they change their place with great nimbleness when they see a gun levelled. They have most of the actions of a common squirrel: are easily tamed; and their flesh is esteemed very delicate. The furs, which are imported under the name of *petit gris*, are valuable, and used as linings to cloaks. This squirrel is the prey of the rattle-snake.

8. S. niger. Black squirrel.

This species has plain ears, and is sometimes wholly black, but often marked with white on the nose, the neck, or the end of the tail. The tail is shorter than that of the former; but the body is equal. It inhabits the north of Asia, North America, and Mexico. It is as numerous and destructive as the former species, which it resembles also in the manner of making its nest, and laying up a stock of winter provision; so that we should have been ready to reckon it only a variety, did not Catesby expressly say, that it breeds and associates in separate troops.

There is a variety of this species in Virginia, by some writers made a distinct genus, called by the planters the cat squirrel. It is of the size of the grey squirrel, has plain ears, coarse fur, mixed with dirty white and black; but varies to white. Its throat, and the inside of its legs and thighs, are black. Tail much shorter than those of squirrels usually are, and of a dull yellow colour, mixed with black.

9. S. Hudsonius. Hudson's Bay squirrel.

10. S. variegatus. Varied squirrel.

11. S. flavus. Fair squirrel.

These also are Americans, and differ chiefly in colour and size.

The Hudson's Bay squirrel is smaller than the European, has plain ears, and is marked along the back with a ferruginous line from head to tail: sides paler; belly of a pale ash colour, mottled with black; tail neither so long nor so bushy as that of the common kind; but of a ferruginous colour, barred with black.

The Carolina squirrel is a variety of the same species, though made a distinct genus of by some writers. Its head, sides, and back are grey, white and rust colour intermixed: belly white, and divided from the sides by a ferruginous line: lower parts of the legs red: tail brown, mixed with black, and edged with white. This is also less than the European squirrel: it varies in colour; but in most the grey predominates.

The varied squirrel has plain ears: the upper part of its body is diversified with black, white, and brown: its belly tawny. It is twice the size of the common squirrel. Inhabits Mexico, lives under ground, lays in a stock of winter food: lives on maize, but is never to be tamed.

The fair squirrel is of a very small size. Its body and tail are of a flaxen colour: has plain round ears, and a rounded tail, and inhabits the wood near Amadabad, the capital of Guzarat, where it is to be seen in great abundance, leaping from tree to tree. Linnæus says it is an inhabitant of South America.

12. S. æstuans. Brasilian squirrel.

13. S. Mexicanus. Mexican squirrel.

These are also natives of America. The former eight inches long, covered with soft dusky hairs, tipt with yellow. Its tail, which is ten inches long, annulated with black and yellow: throat cinereous: inside of its legs and belly yellow: belly divided lengthways with a white line, which begins on the breast, interrupted for a small space in the middle, and then continued to the tail. It inhabits Brazil and Guiana.

The Mexican squirrel is of a mouse colour. The male is marked on the back with seven white lines, which extend along the tail; the female with only five. The scrotum of the male is pendulous like a goat's.

14. S. palmarum. Palm squirrel. This species has plain ears, an obscure pale yellow stripe on the middle of the back, another on each side, and a third on each side of the belly. The two last in some are very faint: the rest of the hair on the back, sides, and head, is black and red, very closely mixed; on the thighs and legs redder: the belly of a pale yellow. The hair on the tail is coarse, and does not lie flat: it is of a dirty yellow, barred with black.

They live much in cocoa trees, and are very fond of palm wine: does not erect its tail like the other squirrels, but expands it sideways. Inhabits the hot parts of Asia and Africa: not three inches long.

15. S. getulus. Barbary squirrel. This has full black eyes, with white orbits: head, body, feet, and tail cinereous, inclining to red, lighter on the legs: sides marked lengthways, with two white stripes: belly white: tail bushy, marked regularly with shades of black: is of the size of the common squirrel. Inhabits Barbary, and lives in trees, especially the palm.

16. S. Badjing. Plantane squirrel. This derives its name from the tree which is its favourite residence, though it is also found in tamarind trees. It resembles the common squirrel, but is lighter-coloured, and has a yellow line extending along its sides from leg to

Sciurus

S. Volans. Flying Squirrel.



Simia.



Prude Monkey.

S. Nasuta.

Long-nosed Monkey.

Published by Sherwood & Co. Paternoster Row. July 1st 1812.

leg: is very shy, and retreats at the sight of mankind. Inhabits Java and Prince's Island.

We come now to the division of this genus, marked by the flying membrane extended from the fore to the hind leg of each species.

17. S. sagitta. Javan flying squirrel. This is also called by some writers the sailing squirrel. Names are necessary for distinction; but may sometimes mislead. This squirrel has nothing to do with the water. He inhabits Java, and others of the Indian islands, leaps from tree to tree, as if he flew, and will catch hold of the boughs with his tail. These vary in size, some being of the size of a common squirrel; others as large as a hare. The usual length, from the nose to the tail, is eighteen inches; the tail fifteen. Colour of the head, body and tail, a bright bay, in some parts inclining to orange: breast and belly yellowish white: head small and rounded; upper lip cloven; ears small and blunt: has two small warts at the outmost corner of each eye, with hairs growing out of them: neck is short: four toes on the fore-feet; and, instead of a thumb, a slender bone, two inches and a half long, lodged under the lateral membrane, and serving to stretch it out; from thence to the hind-legs extends the membrane, which is a continuation of the skin of the sides and belly, and spreading along from the wrist stretches out to the knees in a winged form. This species has five toes on the hind feet; and, on all the toes, sharp, compressed, bent claws. Its tail is covered with long hairs, disposed horizontally. Nieuhoff describes it under the name of the flying cat.

18. S. Hudsonius. Hudson squirrel.

19. S. volucella. Flying squirrel.

The former of these is found about the Severn River in the southern parts of Hudson's Bay. In the philosophical transactions, it is called the greater flying squirrel. Its back and sides are of a deep ash colour at bottom, ferruginous on the surface. The under side of the body is of a yellowish white: hair every where long and full: flying membrane extended from leg to leg, but does not border the fore-legs.

The flying squirrel is much less than the common squirrel. Its colour above brownish ash; beneath, white tinged with yellow: round naked ears; full black eyes; lateral membrane from the fore to the hind legs; the fore legs for the most part clear of the membrane: hair on the tail long, disposed horizontally, longest in the middle, and ending in a point. Inhabits North America and New Spain; and in some measure resembles the owl, as it lives in hollow trees, sleeps during the day, and is very lively in the night. Gregarious, numbers of them being found in one tree. They leap from bough to bough, sometimes to the distance of ten yards. This action is improperly called flying; for the animal can move in no other direction than forward, and even sinks considerably during its leap. Sensible of this, it mounts in proportion to the distance it wishes to reach. When numbers of them leap at a time, they seem like leaves blown off by the wind. Their food is the same with the other American squirrels. They are easily tamed; and bring three or four at a time. The flying-membrane when stretched out enables the squirrel to swim.

20. S. Virginianus. Virginian or hooded squirrel.

21. S. volans. Lapland flying squirrel.

The hooded squirrel, according to Seba, who is the only author that has described it, inhabits Virginia. Its lateral membrane begins at the chin and ears, and extends from the fore to the hind leg. It is reddish above, cinereous, tinged with yellow beneath: ears large and oval.

The Lapland flying squirrel inhabits Finland and Lapland, and the Russian dominions, to the north-east of Siberia, and is common in all the mountainous tracts of that cold region. It lives usually on birch tree buds, and fructifications, and on the cones of the pines and cedars. It leads a solitary life, and wanders about even in winter: resides in hollow trees, and makes its nest of moss. When at rest, flings its tail over its back; but in leaping extends it. The Germans call it the king of the squirrels: ears naked, indented on the exterior side: eyes full; eye-lids bordered with black: membranes extending to the very base of its fore-feet, and forming a large wing on the exterior side: tail full of hair, bushy and round at the end: colour of the upper part of the body a fine grey, like that of a gull's back: lower parts pure white: body four inches and a quarter; tail five.

22. S. australis. Southern flying squirrel.

Body above blackish-brown, beneath whitish; hind-thumbs rounded; tail long, bushy; ears large; membrane somewhat scalloped at the edges, paler; fur exquisitely soft; ears long-ish; over each eye a black stripe; claws, except of the hind-thumbs, sharp, hooked; two toes next the hind-thumb united by the skin. Inhabits New South Wales, and is the largest and most elegant of its tribe. See Nat. Hist. Pl. CLXXIII. CLXXIV.

SCLAREA. (from σκληρος, hard; because its stalks are hard and dry, Blanch.) The garden clary. See SALVIA SCLAREA.

SCLATER (William), an English divine, educated at Eton, and afterwards at King's college, Cambridge, where he took the degree of D.D. He was author of Commentaries on the Epistles to the Romans and Thessalonians, and died at Pitminster in 1627.

SCLAVONIA, a country of Europe, situate between the rivers Drave and Danube on the N. and the Save on the S.; bounded on the W. by Croatia, from which to the conflux of the Save with the Danube it is 150 miles in length, and from 45 to 25 in breadth. It is a fertile level country, divided into six counties, and belongs to the house of Austria. The eastern part is called Ratzia, and the inhabitants Rascians. These form a particular nation, and are of the Greek church. The ancient Sclavonia contained many large countries; some have extended it from the Adriatic to the

Euxine sea, and say that it had its name from the Sclavi, a Scythian nation. See the next article.

SCLAVONIC, the language of the Sclavi, an ancient people of Scythia Europæa, who, about the year 518, quitting their native country, ravaged Greece, and established the kingdoms of Poland and Moravia, and at last settled in Illyria, which thence took the name of Sclavonia.

The Sclavonic is held, after the Arabic, the most extensive language in the world; it is spoken from the Adriatic to the North Sea, and from the Caspian to the Baltic, by a great variety of people, who are all the descendants of the ancient Sclavi, viz. the Poles, Muscovites, Bulgarians, Carinthians, Bohemians, Hungarians, Prussians, Suabians, &c. each of whom, however, have their particular dialect, only the Sclavonic is the common mother of their several languages, viz. the Polish, Russian, Hungarian, &c.

By a Latin chronicle of the Sclavi, composed by Helmold, a priest of Bosow, and Arnold, abbot of Lubec, and corrected by M. Leibnitz, it appears, that the Sclavi anciently inhabited the coasts of the Baltic Sea, and were divided into the eastern and western; in the latter whereof were the Russians, Poles, Bohemians, &c. and in the former the Vandals.

Dom. Maur. Orbini Rauser, abbot of the order of Malta, in an Italian history of the Sclavi, intitled, Il Regno de gli Sclavi, printed in 1601, will have them to be originally of Finland, in Scandinavia. Laur. Pribero, a Dalmatian, in an express discourse on the origin of the Sclavi, maintains them to be originally of Thrace, and the same with the Thracians, the posterity of Thiras, who was the seventh son of Japhet. Theod. Polycarpowitz, in a Greek, Latin, and Sclavonic dictionary, printed at Moscow in 1704, observes that the word Sclava, whence Sclavonic is formed, signifies in their language, glory.

SCLERANTHUS. Knawel. In botany, a genus of the class decandria, order digynia. Calyx one-leafed, inferior; corolless; seeds two, inclosed in the calyx. Three species: two common to the sandy fields of our own country; one indigenous to France and Italy.

SCLERIA, in botany, a genus of the class monoecia, order triandria. Male: calyx, glume from two to six-valved, many-flowered, awnless; corol, glumes awnless, filaments from one to three. Female: glume from two to six-valved, one-flowered, awnless; corolless; stigmas from one to three; not bony, coloured. Nine species, natives of the East or West Indies.

SCLEROCARPUS, in botany, a genus of the class syngenesia, order polygamia frustranea. Receptacle chaffy, downless; calyx double; each of them three-leaved. One species only, a Guinea shrub; erect, branched, bristly; leaves petioled, alternate; flowers terminal, solitary, sessile, yellow.

SCLEROTIC COAT. (*tunica sclerotica*; from σκληρος, to harden; so called from its hardness.) In anatomy, the outermost coat of the eye, of a white colour, dense, and tenacious. Its anterior part, which is transparent, is termed the cornea transparens. It is into this coat of the eye that the muscles of the bulb are inserted.

SCLEROTICS. *s.* (from the adjective.) Medicines which harden and consolidate the parts they are applied to (*Quincy*).

SCLEROTIUM, in botany, a genus of the class cryptogamia, order fungi. Fungus simple, globular, oblong, tough, hardish, opening at last in the centre, covered with an inseparable bark never opening above. Eight species; three oval, four globular or pear-shaped: one only, sclerotium purpureum, common to our own country.

To SCOAT. *To* SCOTCH. *v. a.* To stop a wheel by putting a stone or piece of wood under it before (*Bailey*).

To SCOFF. *v. n.* (*schoppen*, Dutch.) To treat with insolent ridicule; to treat with contumelious language (*Tillotson*).

SCOFF. *s.* (from the verb.) Contemptuous ridicule; expression of scorn; contumelious language (*Watts*).

SCO'FFER. *s.* (from *scoff.*) Insolent ridiculer; saucy scorner; contumelious reproacher (*Burnet*).

SCO'FFINGLY. *ad.* (from *scoffing.*) In contempt; in ridicule (*Broome*).

To SCOLD. *v. n.* (*scholden*, Dutch.) To quarrel clamorously and rudely (*Shakspeare*).

SCOLD. *s.* A clamorous, rude, mean, low, foul-mouthed woman (*Swift*).

SCOLECOLOGY. (from σκωληξ, a worm, and λογος, a disquisition.) The doctrine of worms; a branch of natural history:—HELMINTHOLOGY.

SCOLEX, in zoology, a genus of the class vermes, order intestina. Body gelatinous, variously shaped, broadish on the fore-part and pointed behind; sometimes linear and long, sometimes wrinkled and short, round, flexuous or depressed; head protrusile and retractile. Two species. 1. Scolex pleuronectidis. Head with four auricles; found in the intestinal mucus of the turbot, sole, plaise, gwiniad, and lump-fish; but seldom visible to the naked eye. 2. Scolex lophii. Found in the intestinal mucus of the lophius piscatorius.

SCOLIA, in zoology, a genus of the class insecta, order hymenoptera. Mouth with a curved, sharp mandible, crenate within; jaw compressed, projecting, entire, and horny; tongue inflected, trifid, very short; lip projecting, membranaceous at the tip, and entire; feelers four, equal, short, filiform, in the middle of the lip; antennas thick, filiform, the first joint longer. Thirty-nine species; inhabitants of warmer climates than our own.

SCOLIA. (Greek. Plu.) In music, the name given by the ancients to songs in general, but more especially to those of a festive kind.

Of all the different kinds of scolia that were in use among the inhabitants of Greece, and

that were distinct from religious hymns; those of which we have any remains are chiefly such as were sung at table, during the time of public banquets, or private repasts. We are told, however, by several Greek writers, that in the first use of these, they were real pæans, sacred canticles, or hymns, sung by the whole company to some divinity. It was afterwards the custom for each of the guests to sing one of these songs alone, holding a branch of myrtle in his hand, which he passed about to his next neighbour as we do the bottle; and this may be called the second manner of performing these songs. The third manner was distinguished by the accompaniment of the lyre, and required the skill of professed singers, and citharœdists.

As there were three ways of performing these scolia, the subjects upon which they were composed may be likewise arranged under three classes. The first class consisted of moral songs, of which several are still preserved to us by Athenæus. The second class of scolia comprehends mythological hymns, and historical songs. The third and last class of scolia was upon common and miscellaneous subjects, peculiar to no age or country. The greater number, and the best of these, were upon love and wine. "Love inspires music and poetry," was a memorable maxim among the Greeks.

SCOLIASIS. (from σκωληξ, a worm, or σκολιοω, to twist.) A distortion of the spine.

SCOLOPAX, in zoology, a genus of the class aves, order grallæ. Bill roundish, obtuse, longer than the head; nostrils linear; face covered; feet four-toed, hind-toe consisting of many joints. Fifty species, scattered over the globe; of which fifteen are common to our own country: this genus includes the curlews, snipes, woodcocks, godwits, whimbrels, green, yellow and red shanks. We shall select a few examples.

1. S. arquata. Common curlew. Bill arched, blackish; legs blueish; wings blackish, with snowy spots; body above and breast with dusky brown spots; lower mandible reddish at the base; chin, rump, belly and vent white; quill-feathers black, within spotted with white; legs bluish, toes flat and broad; nearly two feet long. A North American variety diversified with rufous and black. Inhabits moist and fenny places of Europe, Asia, and Africa, in flocks; feeds on worms and marsh insects; lays four eggs, olive, with brown spots; flesh good.

2. S. rusticola. Woodcock. Bill straight, reddish at the base; legs cinereous; thighs covered; head with a black band on each side. There are five or six varieties, with white or pale straw-colour body, spotted or otherwise diversified. Fifteen inches long; lays four or five eggs, rusty with brown spots: flesh and intestines good. Inhabits the northern parts of Europe, Asia, and Africa. In the summer these birds retreat in France to the loftier mountains, and in our own country towards the mountainous regions of Norway and Sweden. Few birds are more widely scattered over the old continent than the woodcocks. They are found, in great plenty, as far south as Smyrna and Aleppo; and in the same season in Barbary, where the Africans call them, from their uncouth shapes, the asses of the partridge. Towards the east, they are found as far as Japan, where they are very common. It has been said, that the woodcock is unknown in North America. This, however, is a mistake; for, all the summer, they are found in Canada and Cape Breton, in such numbers, as render it highly probable that the greater part of those that frequent Great Britain and Ireland come from that continent. On the west of Scotland they are far more numerous than on the east; and on the west of Ireland the observation is still more just. They arrive there in such vast quantities, and are so completely exhausted by their long flight, that they are sometimes taken with the hand.

During the winter they grow gradually more rare, being obliged by the severity of the weather to migrate farther to the south; and about the beginning of March, after they have paired, they generally take their departure both from France and Britain. In both countries, a few are known to remain the whole year, in some of the colder districts; as in the neighbourhoods of Tunbridge and of Burgundy.

Both in its native country, and during its migrations, the woodcock feeds upon small worms, which it finds with its long bill in soft ground and moist woods. When these birds migrate, they generally fly in flocks, and take the advantage of the night, or of cloudy weather. They are, in some respects, night-birds, for they feed most busily in the evenings, and then too their flights are most distant and rapid: an obscure light, probably, best suits the sensibility of their eyes. Their nests are very carelessly constructed of small twigs mixed with withered grass, built generally at the ground, at the root of a tree; and in them are found four or five eggs, of a brownish grey marbled with deeper spots of the same colour. The young run as soon as they leave the shell, and fly when they have hardly any other feathers than those of their wings. In France there are a variety of ways of cocking practised, with springs, gins, and snares, besides the common manner, with the dog and gun.

When the season of shooting grouse and partridges is past, woodcocks are the most common game pursued by the British sportsman; and, in all the western parts of the island, they are found in such abundance, that their numbers are not sensibly diminished by his depredations. For the cocking, there is a species of spaniels particularly trained, which have obtained their name from their employment. These range the woods and coppices till the bird arises, which he commonly does perpendicularly, till he has cleared the tops of the bushes, when he flies generally in an oblique or zig-zag direction. To shoot a woodcock requires all the collected expedition of the most experienced sportsman; and, if the pleasure

we derive from our amusements be proportioned to the dexterity and exertion which are necessary to obtain it, cocking may be reckoned the most interesting of all the amusements of the field.

3. S. gallinago. Common snipe. Bill straight, tuberculate; legs brown; body varied with blackish and tawny, beneath white; front with four brown lines.

The snipes partly migrate, and partly breed in England, during the summer, when they generally resort to the high grounds. Their manner of feeding is nearly the same as that of the woodcock. They continually suck the soft and spongy earth in bogs and springs, and, when opened, there is commonly found in their stomachs some earthy substance, mixed with certain fluids, that probably consist of the digested worms upon which they have fed. The point of the tongue is sharp, for the purpose of penetrating the worms which they find by groping in the mud. This species is seldom seen upon the ground; for, as long as it remains there, it keeps itself carefully concealed among the reeds and rank grass. When sprung its flight is rapid, and so seldom in a straight direction, that the shooting a snipe is a matter of still greater difficulty than shooting a woodcock.

The snipe is commonly a very fat bird, but its fat is light, and of a delicate flavour. It is dressed in the same manner as the woodcock, without taking out the intestines. It is believed that snipes have diminished greatly in number during the last century; a circumstance that seems to indicate the encroachments which agriculture has made on the marshy grounds. The snipe is near twelve inches long; flies with great velocity, and lays four or five dirty olive eggs with reddish spots.

4. S. gallinula. Jack-snipe. Bill straight, tuberculate; body variegated; legs greenish; lores brown; rump varied with violet; bill black; breast spotted; belly and vent white. Inhabits Europe, Asia, and America, and well known to the sportsmen of our own country: length eight and a half inches.

5. S. leucophœa. Godwit. Brown edged with whitish; neck whitish, with small brown spots; chin and belly white; quill-feathers with black bands. Bill a little turned up, brown with a purple base; tail feathers white, the two middle ones wholly, the rest barred with brown on the outer side. Inhabits Europe; sixteen inches long. These are all migratory, appearing in this island in the month of September, and continuing the whole winter. They are taken in the fens of Lincolnshire with nets, and afterwards fattened for the London market, with bread and milk, hempseed, or boiled wheat. If expedition be required, to these materials is added a little sugar, which makes them quite plump in the space of a fortnight. When they are sufficiently fattened, they are sold according to their size, at from two to five shillings each.

6. S. phœopus. Whimbrel. Bill arched, black; legs blueish; back with rhomboid brown spots; rump white. Lower mandible reddish at the base; body above and breast brownish, with dusky brown streaks; tail brown with dusky bars; quill-feathers black, spotted with white within. Inhabits Europe and America; found freely in our own country: half the size of the curlew.

7. S. glottis. Green-shank. Bill straight, the lower base red; body beneath snowy; legs greenish, and very long; head, neck, and back pale cinereous; the shafts of the feathers spotted with brown; quill-feathers dusky, spotted within with white; tail white with dusky lines. Inhabits Asia, Africa, and America; and found together with one or two other species of shank in our own country: fourteen inches long.

SCOLOPENDRA. Centipede. In zoology, a genus of the class insecta, order aptera. Antennas setaceous; feelers two, filiform, united between the jaws; lip toothed and cleft; body long, depressed, consisting of numerous transverse segments; legs numerous, as many on each side as there are segments on the body. Thirteen species, scattered over the globe; three common to our own country.

This tribe has in the Latin language obtained the name of *centi-pes*, from the extraordinary number of feet with which nature has provided some of its species; one tribe having literally not less than an hundred on each side, for so numerous are the segments into which their bodies are divided. Of this hideous race some live beneath the bark of decayed trees, or are found below stones and garden boxes; others inhabit fresh and salt waters, and are all remarkable for their quick progressive motion. They prey on other insects. The following are the chief.

1. S. forficata. Legs fifteen on each side; the last longer than the rest, and turning backwards, from a forked tail: body of a dun colour, smooth, and composed of nine scaly segments, without reckoning the head.

2. S. marina. This in form somewhat resembles the leech; it builds those small edifices of a brittle and porous texture which are seen upon the shore at low water. These masses are composed of a number of small funnels, each having the aperture closed up with a covering of sand, to protect the inhabitant from danger.

3. In the East Indies and America there are scolopendra from four to six inches long, and as thick as the finger: when of that bulk, they appear truly hideous, and their bite is reckoned dangerous. Some of these animals are said to be without eyes, and to direct their course by means of two feelers that extend beyond the head. It has been asserted too, that when cut into pieces, each segment, like those of the polypi, is capable of reproducing an entire animal. The most venomous of the genus is scolopendra morsitans, with twenty legs on each side, and with eight eyes. It inhabits India.

Some of these are phosphorescent: such is,

4. S. electrica. Legs seventy on each side;

Scarabaeus.

S. Hercules, Hercules Beetle.



Scorpio.



S. Afer, African Scorpion.

Scolopendra?

S. Morsitans.



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body linear. Inhabits our own country and Europe generally in decayed wood, and shines in the dark.

5. S. phosphorea. Legs seventy-six on each side. Inhabits Asia, and shines like the glow-worm in the dark: has been known to fall from the air into a vessel a thousand miles from land, in the Indian sea. See Nat. Hist. Pl. CLXXII.

SCOLOPENDRIA. The spleenwort or miltwaste is sometimes so called. See CETERACH.

SCOLOPENDRIUM. (σκολοπενδριον; from σκολοπενδρα, the earwig; so called because its leaves resemble the earwig.) In botany, a genus of the class cryptogamia, order filices. Fructification in scattered double lines, between two veins; involucres originating from the surface, longitudinally incumbent on each other, opening by a longitudinal suture. One species only, scolopendrium vulgare, or hart's tongue as called vernacularly. It grows on most shady banks, walls, &c. It has a slightly astringent and mucilaginous sweetish taste. When fresh and rubbed, it imparts a disagreeable smell. Hart's tongue, and the five capillary herbs, of which it is one, was formerly much used to strengthen the viscera, restrain hæmorrhages and alvine fluxes, and to open obstructions of the liver and spleen, and for the general purposes of demulcents and pectorals.

SCOLOPIA, in botany, a genus of the class icosandria, order monogynia. Calyx inferior, three or four-parted; petals three or four; berry crowned with the style, one-celled, six-seeded; seeds coated. One species only, a plant of Ceylon, sometimes named thorny cinnamon.

SCOLOSANTHUS, in botany, a genus of the class tetrandria, order monogynia. Calyx four-cleft; corol tubular, with a revolute border; drupe one-seeded. One species only, a shrub of Trinidad with square branches; leaves opposite, elliptic-lanceolate; panicle terminal.

SCOLYMUS. Golden thistle. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle chaffy; calyx imbricate, spinous; downless. Three species; natives of Barbary and the south of Europe.

SCOMBER. Mackarel. In zoology, a genus of the class pisces, order thoracica. Head compressed, smooth; gill-membrane with seven rays; body smooth; lateral line carinate behind; between the dorsal fin and tail are frequently several spurious fins. Twenty-two species, thus divided into sections.

A. Spurious fins distinct.

B. Without spurious fins.

C. Spurious fins connected.

The following are chiefly worthy of notice.

1. S. scomber. Common mackarel. Spurious fins five. Inhabits the European, American, Atlantic, and Mediterranean seas; from one to two feet long; body above the lateral line dark green, varied with blue and crossed with black lines; beneath silvery. When just taken out of the water emits a phosphoric light, and soon dies.

This is one tribe of those shoals of migratory fishes, which annually visit our coast; and is perhaps among the most celebrated of that class, both for its numbers and the delicacy of its food. They are gregarious in their habits; and visit their accustomed haunts at stated seasons with so much regularity, that we can punctually pronounce the time of their appearance.

What impels the mackarel and other migratory fishes to undertake such distant voyages, what directs their course, and what supports them upon their passage, are subjects on which naturalists have indulged in all the licence of conjecture, without being able to form any satisfactory determination. Some have imagined, that we owe the visits of the whiting, the haddock, and the mackarel, rather to their fears than their appetite; and that they are driven upon our coasts in endeavouring to avoid the pursuit of their destroyers. It is most probable that they approach the shore in quest of food, which is found in greater plenty on the coast than in the depths of the sea.

It is to be regretted, that the mackarel, though perhaps the most palatable of all the gregarious fishes, is least useful for carriage, owing to its extreme tenderness. It is capable, indeed, of being preserved by pickling and salting; a method which we are surprised to find is only practised in Cornwall, where this food proves a great relief to the poor during winter.

The ancient Romans were just to the merits of this fish; for among them it was held in high esteem; more especially on account of the garum, a celebrated pickle, that gave a high relish to their sauces, besides being medicinally useful. According to Belon, this precious pickle is still in fashion at Constantinople. Formerly it was prepared from different kinds of fishes; but that procured from the mackarel was deemed preferable: the best was made at Carthagena, vast quantities of mackarel being taken near an adjacent isle, called from that circumstance scombraria.

The mackarel is easily snared by a variety of baits; but the capture always succeeds best during a gentle gale of wind: a coloured feather, or a piece of scarlet cloth, is often found sufficient to allure these dim-sighted animals to destruction. In spring more especially their eyes are covered with a white film, which renders them half blind, till it is cast some time in the summer.

This fish is probably found in all the European seas, being universally known in that quarter of the globe. It seldom exceeds two pounds weight in the common species, and its body is of a very elegant form, and beautifully variegated with the finest hues of green, blue, and silver. The common mackarel is from a foot to a foot and a half long; the body thick, round, and fleshy, but tapering to a slender point as it approaches the tail, which is bifurcated: scales so small as to be hardly perceptible; behind the anal and second dorsal fin are several protuberances or spurious fins, both above and below.

2. S. thynnus. Thunny. Spurious fins from eight to eleven. Inhabits most seas, and is from two to ten feet long: body spindle-shaped, silvery, above steel-blue and a little

convex; swims with great swiftness, and periodically frequents the shores of the Mediterranean sea in vast shoals, swimming in a regular parallelogram, and making a prodigious hissing noise. They enter the Mediterranean from the Atlantic ocean, and are taken by the inhabitants of the coasts of Spain and Italy as they advance. They were supposed by the ancients to breed in the Levant, and Palus Mæotis. Some of them grow to an immense size, weighing above four hundred pounds; a magnitude which seems altogether incompatible with the short life which the ancients allotted to these fishes; for both Pliny and Aristotle assert, that two years is the utmost period of the life of a thunny.

A very extensive thunny fishery was carried on by the ancients in the Mediterranean; particular stations called Θυννοσκοπεια (Thunnoscopæa) being fixed upon for that purpose, near some promontory, where a man was placed to give notice of the motions of the shoals, and to warn the fishermen below. It is from one of these precipices that the lover in Theocritus threatens to leap, with a view of softening the rigour of his mistress's cruelty. The manner of taking the thunny in nets, as at present practised, is perhaps similar to that of the ancients; many of the fishing stations are exactly the same. The trade is still carried on to a great extent: when taken, the fishes are cut into pieces and salted up in barrels, in which state they are exported to all the neighbouring countries. The abdomen is reckoned by far the most delicate part of the fish; it is cut separately, and sold to the nobility and wealthy citizens of Rome, under the name of taremtello.

The thunny frequents the English coasts, but not in the same numerous shoals that are seen in the Mediterranean. It is also pretty common in the lochs on the western coasts of Scotland, where it comes in pursuit of herrings, and often during night strikes into the nets, to the great damage of their owners. In the morning, when the nets are drawn by the fishermen, the thunny watches near them, for any fish that may chance to drop out. The fishermen avail themselves of this avidity for prey in the thunny, and baiting a hook with a herring, they seldom fail to take him.

The flesh of the thunny, when recently taken and cut up, has the appearance of raw beef; and after boiling, it turns pale and tastes like salmon. It is said to be sometimes poisonous, which may be occasioned by its feeding on noxious molluscæ. It spawns in May or June.

3. S. trachurus. Scad. Horse-mackarel. Dorsal spine recumbent; lateral line prickly. Inhabits European, American, and Pacific seas: from a span to two feet long; body silvery; front and back mixed green and blue; long, compressed, covered with thin, round, soft scales; flesh eatable, but tough; found frequently on our own coasts.

4. S. chrysurus. Yellow-tail. Spurious fins pale yellow; mouth without teeth. Inhabits Carolina; spines before the anal fin remote.

SCOMM. *s.* A buffoon: out of use.

SCONCE. *s.* (*schantz*, German.) 1. A fort; a bulwark (*Shakspeare*). 2. The head. A low word (*Shakspeare*). 3. A pensile candlestick, generally with a looking-glass to reflect the light (*Swift*). 4. A mulct, or fine.

To SCONCE. *v. a.* To mulct; to fine.

SCONE, or SCOON, a village of Scotland, on the E. side of the river Tay, a mile N. of Perth. Here is an ancient palace where the kings of Scotland used to be crowned, and on a celebrated stone, which is now removed to England.

SCOOP. *s.* (*schoepe*, Dutch.) 1. A large ladle; a vessel with a long handle used to throw out liquor (*Mortimer*). 2. A chirurgeon's instrument (*Sharp*). 3. A sweep; a stroke (*Shakspeare*).

To SCOOP. *v. a.* (*schoepen*, Dutch.) 1. To lade out (*Dryden*). 2. To empty by lading (*Addison*). 3. To carry off, so as to leave the place hollow (*Spectator*). 4. To cut into hollowness or depth (*Pope*).

SCOOPER. *s.* (from *scoop.*) One who scoops.

SCOPA REGIA. The butcher's broom, or knee holly. See RUSCUS.

SCOPARIA, in botany, a genus of the class tetrandria, order monogynia. Calyx four-parted; corol four-parted, wheel-shaped; capsule one-celled, two-valved, many-seeded. Three species; two of the West Indies and America; one of the Cape, a tree resembling the olive, with small flowers.

SCOPE. *s.* (*scopus*, Latin.) 1. Aim; intention; drift (*Addison*). 2. Thing aimed at; mark; final end (*Milton*). 3. Room; space; amplitude of intellectual view (*Newton*). 4. Liberty; freedom from restraint (*Shakspeare*). 5. Liberty beyond just limits; licence (*Shakspeare*). 6. Act of riot; sally (*Sh.*). 7. Extended quantity (*Davies*).

SCOPELO, an island of the Archipelago, five miles E. of Sciati. It is 10 miles long and five broad. Lon. 23. 50 E. Lat. 39. 24 N.

SCOPIA, a town of European Turkey, in Macedonia, and an archbishop's see. It is seated on the Vardar, over which is a bridge of 12 arches, 150 miles N.N.W. of Salonica. Lon. 21. 45 E. Lat. 42. 40 N.

SCOPOLIA, in botany, a genus of the class pentandria, order monogynia. Calyx five-cleft; corol five-petalled; stigma capitate; capsule berried, five-celled; the cells one-seeded. Two species; one a native of the East Indies, the other probably of the isle of Bourbon.

SCO'PULOUS. *a.* (*scopulosus*, Lat.) Full of rocks.

SCOPUS. Tufted umbre. In zoology, a genus of the class aves, order grallæ. Bill long, thick, compressed, a little hooked; nostrils linear, oblique; feet four-toed, cleft. One species only, scopus umbretta, with a thick, tufted, lax crest; body brown; tail obcurely barred; legs longish, brown; toes connected at the base. The female not crested. Inhabits Africa; twenty inches long.

SCORBU'TICAL. SCORBU'TIC. *s.* (*scorbutique*, French; from *scorbutus*, Latin.) Diseased with the scurvy (*Arbuthnot*).

SCORBU'TICALLY. *ad.* With tendency to the scurvy; in the scurvy (*Wiseman*).

SCORBU'TUS. (from *schorboct*, German.) The scurvy. A genus of diseases in the class cachexiæ, and order impetigines of Cullen; characterized by extreme debility; complexion pale and bloated; spongy gums; livid spots on the skin; breath offensive; œdematous swellings in the legs; hæmorrhages; foul ulcers; fetid urine; and extremely offensive stools. The scurvy is a disease of a putrid nature, much more prevalent in cold climates than in warm ones, and which chiefly affects sailors, and such as are shut up in besieged places, owing, as is supposed, to their being deprived of fresh provisions, and a due quantity of acescent food, assisted by the prevalence of cold and moisture, and by such other causes as depress the nervous energy, as indolence, confinement, want of exercise, neglect of cleanliness, much labour and fatigue, sadness, despondency, &c. These several debilitating causes, with the concurrence of a diet consisting principally of salted or putrescent food, will be sure to produce this disease. It seems, however, to depend more on a defect of nourishment than on a vitiated state; and the reason that salted provisions are so productive of the scurvy is, most probably, because they are drained of their nutritious juices, which are extracted and run off in brine. As the disease is apt to become pretty general amongst the crew of a ship when it has once made its appearance, it has been supposed by many to be of a contagious nature; but the conjecture seems by no means well founded.

A preternatural saline state of the blood has been assigned as its proximate cause. It has been contended by some physicians, that the primary morbid affection in this disease is a debilitated state of the solids, arising principally from the want of aliment.

The scurvy comes on gradually, with heaviness, weariness, and unwillingness to move about, together with dejection of spirits, considerable loss of strength, and debility. As it advances in its progress, the countenance becomes sallow and bloated, respiration is hurried on the least motion, the teeth become loose, the gums are spongy, the breath is very offensive, livid spots appear on different parts of the body, old wounds which have been long healed up break out afresh, severe wandering pains are felt, particularly by night, the skin is dry, the urine small in quantity, turning blue vegetable infusions of a green colour; and the pulse is small, frequent, and, towards the last, intermitting; but the intellects are, for the most part, clear and distinct.

By an aggravation of the symptoms, the disease, in its last stage, exhibits a most wretched appearance. The joints become swelled and stiff, the tendons of the legs are rigid and contracted, general emaciation ensues, hæmorrhages break forth from different parts, fetid evacuations are discharged by stool, and a diarrhæa or dysentery arises, which soon terminates the tragic scene.

Scurvy, as usually met with on shore, or where the person has not been exposed to the influence of the remote causes before enumerated, is unattended by any violent symptoms, as slight blotches, with scaly eruptions on different parts of the body, and a sponginess of the gums, are the chief ones to be observed.

In forming our judgment as to the event of the disease, we are to be directed by the violence of the symptoms, by the situation of the patient with respect to a vegetable diet, or other proper substitutes, by his former state of health, and by his constitution not having been impaired by previous diseases.

Dissections of scurvy have always discovered the blood to be in a very dissolved state. The thorax usually contains more or less of a watery fluid, which, in many cases, possesses so high a degree of acrimony, as to excoriate the hands by coming in contact with it: the cavity of the abdomen contains the same kind of fluid; the lungs are black and putrid; and the heart itself has been found in a similar state, with its cavity filled with a corrupted fluid. In many instances, the epiphyses have been found divided from the bones, the cartilages separated from the ribs, and several of the bones themselves dissolved by caries. The brain seldom shews any marks of disease.

SCORCE. *s.* This word is used by *Spenser* for discourse, or power of reason.

To SCORCH. *v. a.* (ꝛcopenen, Saxon, burnt.) 1. To burn superficially (*Dryden*). 2. To burn (*South*).

To SCORCH. *v. n.* To be burnt superficially; to be dried up (*Roscommon*).

SCORDISCI and SCORDISCÆ, a people of Pannonia and Thrace, well known during the reign of the Roman emperors for their barbarity. They were fond of drinking human blood, and they generally sacrificed their captive enemies to their gods.

SCORDIUM. (ꝛkopδιον; from ꝛkopδον, garlic; so called because it smells like garlic.) Trissago palustris. Chamædrys palustris. Water germander. Teucrium scordium of Linnæus. The leaves of this plant have a smell somewhat of the garlic kind, from which circumstance it is supposed to take its name, σκορδον signifying garlic: to the taste they are bitterish and slightly pungent. The plant was formerly in high estimation, but is now justly fallen into disuse, although recommended by some in antiseptic cataplasms and fomentations.

SCORE. *s.* (*skora*, Islandick.) 1. A notch or long incision (*Shakspeare*). 2. A line drawn. 3. An account which, when writing was less common, was kept by marks on tallies, or by lines of chalk (*South*). 4. Account kept of something past; an epoch; an era (*Tillot.*). 5. Debt imputed (*Shakspeare*). 6. Reason; motive (*Collier*). 7. Sake; account; relative motive (*Swift*). 8. Twenty (*Pope*).

SCORE, in music, the original and entire draught, or its transcript, of any composi-

tion. In the score all the parts of the piece are ranged perpendicularly under each other, so that the eye, catching the corresponding bars of the several staves, sees at a glance the whole construction and design of the harmony.

As in this disposition, one single line of music comprehends as many staves as there are parts, these staves are held together by a brace drawn down the margin at the beginning of the line.

The use of the score is indispensable in composition: to the conductor of any performance it is also highly requisite, in order to his knowing whether each performer follows his part, and to enable him to supply any accidental omission with the piano-forte, or organ, at which he presides.

To SCORE. *v. a.* 1. To set down as a debt (*Swift*). 2. To impute; to charge (*Dryden*). 3. To mark by a line (*Sandys*).

SCORED STEM, in botany. (*Exaratus caulis.*) Marked deeply with parallel lines or rather grooves.—It does not seem to differ from *sulcatus*, furrowed or grooved.

SCORIA, in mineralogy, spongy lava, volcanic slaggs. See LAVA.

SCORIÆ. (*scoria*, from σκωρ, excrement.) Dross. The refuse or useless parts of any substance.

SCO'RIOUS. *a.* (from *scoria*, Lat.) Drossy; recrementitious (*Brown*).

SCORLUS, in mineralogy, schorl; a genus of the class earths, order argillaceous. Consisting of alumina, and silica, very often oxyd of iron, with frequently a little carbonat of magnesia, and oxyd of manganese: hard, breaking into indeterminate fragments, shining internally, parasitical; not effervescing with nitric acid, and easily melting into a glass. Six species.

1. S. granaticus. Volcanic schorl. Leucite. Basaltine. White garnets. White, hardish, fusible in the fire with some difficulty, easily mouldering. Found in the lavas of Vesuvius, where it appears, according to Kirwan, to have pre-existed in the rocks which were the mother-stones or bases of lavas before the eruption, and is not formed by subsequent percolation through, and crystallization in the melted lava; colour white, or greyish-white; always found in crystals, the primitive forms of which are cubes or rhomboidal dodecahedrons; texture foliated, fracture more or less conchoidal; sometimes transparent, but opake when decomposing: its powder causes syrup of violets to assume a green colour; is hardly fusible before the blowpipe, and gives a white transparent glass with borax: spec. grav. from 2,455 to 2,490: contains silica 54. alumina 23. potash 22. iron 0. *Klaproth.*

2. S. vitreus. Thummerstone. Brown purple schorl. Brittle, shining, of a minutely conchoidal texture, easily melting before the blow-pipe with froth into a hard black enamel. Found in Saxony, Dauphigné, in the Pyrenean mountains, and in Norway; colour clove-brown, sometimes inclining to red, green, grey, violet or black; generally found in crystals, the most usual of which are flat, rhomboidal parallelopipeds with the opposite edges a little truncated; the faces generally streaked longitudinally except where truncated.

3. S. tabularis. Hoary, semipellucid, consisting of very thin four-sided tables compacted into thicker ones. Found near Bourg de Oisans in Dauphigné with the last species; compact, a little polished, and somewhat shining internally, of a rather plane texture: the lateral faces of the tables cylindrico-concave, the terminal ones generally slightly convex.

4. S. Vesuvianus. Hyacinthine. Vesuvian. Diaphonous, fulvous, in six-sided, prismatic crystals. Found scatteredly in the lavas of Vesuvius, and formerly confounded with the hyacinth; colour sometimes greenish; scratches glass; lustrous, glassy; fracture imperfectly conchoidal; causes double refraction; melts before the blow-pipe into a yellowish glass: specific gravity from 3,39 to 3,409.

5. S. genuinus. Black schorl. Brasil tourmalin. Columnar figured basalt. Ponderous, opake, making a pale grey scratch. Found in Cornwall, where it is known under the name of cockle, in Ceylon, Madagascar, Spain, Italy, Switzerland, France, Hungary, Saxony, &c. in mass, disseminated and crystallized, generally in granite, gneiss, and other similar rocks; the crystals are three or nine-sided prisms, which, when entire, are terminated by three-sided pyramids; the surface of the crystals longitudinally streaked; the amorphous kind presents them straight, distinct, columnar concretions, sometimes parallel, sometimes divergent or stellate, streaked, and easily separable from each other; very seldom in granular concretions: the surface can be scratched with a hard knife, and when heated or rubbed hard is a little electric; when heated to redness it becomes reddish-brown; is often so rich in iron as to be attracted by the magnet; is acted upon by nitric acid, and before the blow-pipe melts into a brownish compact enamel: specific gravity from 3,054 to 3,092.

There is another variety denominated Ceylanite, Zeylanite, by Haüy pleonaste, found at Ceylon in regular six-sided crystals with the margins generally truncate, sometimes in rounded masses, generally opake except when in very thin pieces; colour of the mass black, of very thin laminæ, green, red, dusky-yellow, or blueish; powder greenish-grey; specific gravity from 3,7647 to 3,793.

6. S. electricus. Electric schorl. Ceylon tourmaline. Diaphonous borax. When heated to 200° of Fahrenheit attracting light bodies by one end, and repelling them by the other. Found in the rivers of Ceylon, in Brasil, Castilia, the islands on the coast of France, Greenland, Norway, Sweden, Switzerland, and Germany, and near Freyburg, in Saxony, in granite, gneiss, and other similar rocks, sometimes in amorphous pieces, but more generally crystallized in three or nine-sided prisms, with four-sided summits, sometimes in grains; colour generally green, sometimes brown, red, or blue; fracture conchoidal, with often a ten-

dency to the foliated; is not readily acted upon by acids; reddens when heated; and melts with difficulty into a white or grey enamel: if one end be heated and the other cooled, attracting light bodies by both ends: specific gravity from 3,05 to 3,155: contains

Silica	40
Alumina	39
Oxyd of iron	12
Lime	4
Oxyd of manganese	2.5
Loss	2.5
	100.

To SCORN. *v. a.* (*schernen*, Dutch; *escorner*, French.) To despise; to slight; to revile; to vilify; to contemn (*Job*).

To SCORN. *v. n.* 1. To scoff; to treat with contumely (*Shakspeare*). 2. To disdain; to think unworthy (*Pope*). 3. To despise; to contemn (*Milton*). 4. To neglect; to disregard (*Milton*).

SCORN. *s.* (*escorne*, old French.) 1. Contempt; scoff; slight; act of contumely (*Til.*). 2. Subject of ridicule; thing treated with contempt (*Addison*).

SCO'RNER. *s.* (from *scorn.*) 1. Contemner; despiser (*Spenser*). 2. Scoffer; ridiculer (*Prior*).

SCO'RNFUL. *a.* (*scorn* and *full.*) 1. Contemptuous; insolent (*Dryden*). 2. Acting in defiance (*Prior*).

SCO'RNFULLY. *ad.* (from *scornful.*) Contemptuously; insolently (*Atterbury*).

SCORPÆNA. In zoology, a genus of the class pisces, order thoracica. Head large, aculeate, cirrous, obtuse, without scales, subcompressed; eyes near each other; teeth in the jaws and palate; gill-membrane seven-rayed; body thick, fleshy; dorsal fin single, long, the anterior rays spinous. Nine species; scattered over the globe. The following are chiefly worthy of notice.

1. S. porcus. Smaller or porcine scorpæna. Cirri near the eyes and nostrils. Inhabits the Mediterranean in shoals; hides itself among the sea-weeds, and preys on fishes and crabs; when touched erects and wounds with the spines of the dorsal fin. In its external figure it resembles a perch: is thick in proportion to its length, and loaded with an enormous head, rendered frightful by the strong spines with which it is beset: above a foot long: colour darkish dirty yellow, interspersed with brown spots: skin covered with extremely minute scales, resembling those of serpents. Above each eye is a small fin-like crest, as is observed in the blenny; and at the apertures of the nostrils a second pair: along the back one large fin, which, from its lowness in the middle, has the appearance of two: rays upon the first lobe sharp and prickly, upon the second cartilaginous: pectoral fins broad, rounded, and prickly; each ray projecting beyond the membranes, and presenting a large spine: ventral fins also with a spine terminating the first ray.

2. S. scrofa. Greater or rufous scorpæna. Lower lip with two cirri. Head large; eyes very large, pupil black, iris yellow or reddish with four brown rays, above them three cirri; mouth large; cheeks and lower jaw cirrous; jaws equal; and with the tongue and palate armed with sharp, recurved teeth; aperture of the gills large, the cover with two large and many smaller spines; back brown; fins blueish, the rays varied with yellow and brown, and mostly forked. Inhabits the Atlantic, Mediterranean, and Northern seas; from three to four yards long; a most voracious fish, preying not only on other fishes, but also on sea-birds; body whitish-tawny, spotted with brown, and covered with large scales: flesh eaten in Italy.

3. S. horrida. Body beset with callous tubercles. Inhabits India; the body variegated with brown and white, devoid of small scales, and on all sides rough with cirri. Head very large, covered with tubercles and prickles and disfigured by cavities; eyes small, pupil black, iris yellow, placed above a deep hollow; mouth above large, inside armed with numerous small sharp teeth; lateral line beginning at the nape and bent downward near the anal fin, and ending in the middle of the tail; fins covered with a thick skin, the rays forked. One of the most uncouth and hideous animals embosomed in the deep, resembling rather some imaginary monster than a natural deformity or unsightliness.

4. S. volitans. Pectoral fins larger than the body. Inhabits the fresh waters of Amboina and Japan; less than the river perch; has the power of raising itself out of the water and of suspending itself in the air a short time by means of its long pectoral fins, when pursued by larger fishes: body varied with brown bands and intermediate orange and white lines, and covered with small imbricate scales: flesh delicious. See Nat. Hist. Pl. CXC.

SCORPIO. Scorpion. In zoology, a genus of the class insecta, order aptera. Legs eight, besides two chelæ or hands seated on the forepart of the head; eyes eight, three placed on each side of the thorax and two on the back; feelers two, projecting, cheliform; lip bifid; antennaless; tail long-jointed and terminated by a sharp crooked sting; on the underside between the breast and abdomen are two instruments resembling a comb. Ten species; inhabitants of climates warmer than our own.

These are all armed with a slighdy pungent sting; but none of them are dangerous except in very hot climates. They prey upon worms, spiders, flies, &c. and even on one another. Larve and pupe eight-footed, nimble, and resembling the perfect insect. We shall select an example or two.

1. S. Americanus. Combs with fourteen teeth; hands subciliate, with filiform claws. Body spotted with brown. Nearly two inches in length. Inhabits South America.

2. S. Europæus. Italian scorpion. Combs with eighteen teeth; hands angular, long, with cheliform claws. Body brown. From the head to the end of the tail about three inches long. Inhabits the southern parts of Europe,

and is said to be viviparous. This species is fondest of spiders as a food; and with the larger ones has often severe contests. After having stung his adversary to death, he cuts off his limbs with his claws and sucks the juice from his body.

3. S. afer. Combs with thirteen teeth; hands slightly heart-shaped and hairy. Inhabits India and Persia. Colour deep glossy brown; segments of the body each terminating in a band of bright yellow; the two eyes in the back sparkling like diamonds: in its general appearance strongly resembling the lobster. Most of the travellers who have visited Africa represent this animal not only as poisonous, but exceedingly irascible; and its poison, unless speedily attended to, as fatal.

It is to M. de Maupertuis that the public is indebted for the first accurate and philosophical account of these animals. According to him, they are all viviparous; the body of the pregnant female exhibiting, when opened, between forty and fifty living young. Each of these is separated from the rest by a thin membrane, while all are united by a common filament. In order to ascertain the strength of their venom, this philosopher bred a great number together, and let them loose upon dogs and other animals; and he found that sometimes the sting was so poisonous as to swell the whole body of the wounded animal, who was attacked with violent retching, convulsions, and death. At other times, whether from the difference of food, or some other cause, he found their sting harmless.

The scorpion is supposed to discharge his poison from two or three foramina at the tip of the sting. Some naturalists, however, have denied the existence of any such foramina; and the question is not completely settled. See Nat. Hist. Pl. CLXXII.

SCORPION. (*scorpio.*) In astronomy, the eighth sign of the zodiac, denoted by the character ♏. The stars in the constellation scorpio, in Ptolemy's catalogue, are 20; in Tycho's 10; and in Mr. Flamsteed's 49.

Scorpion, in the ancient art of war, an engine chiefly used in the defence of the walls of fortified places, by throwing arrows, fireballs, or great stones.

Scorpion, in entomology. See Scorpio.

Scorpion fly. See Panorpa.

Scorpion senna. See Coronilla.

SCORPIURUS. Caterpillar. In botany, a genus of the class diadelphia, order decandria. Calyx inflated, five-toothed; loment divided by transverse partitions, revolute, cylindrical. Five species, natives of Barbary and the south of Europe; of which the three following are cultivated.

1. S. vermiculata. Common caterpillar; with herbaceous trailing stalks, and yellow flowers, succeeded by a loment or pod of the size and appearance of a large green caterpillar.

2. S. muricata. Two-flowered caterpillar; with stronger stalks and a stronger plant.

3. S. sulcata. Furrowed caterpillar; with slender stalks, slender peduncles, and slender loments. They may be increased by seeds, and are generally cultivated for the singularity and curiosity of their pods.

SCORZA (Senibaldo), a painter and engraver, born at Vollaggio, and died in 1631, aged 41. He engraved after the designs of Albert Durer, with great exactness. As a painter he excelled in representations of animals and flowers.

SCORZONERA. Viper's-grass. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked; down feathery, mostly sessile; calyx imbricate, with the scales scarious at the edge. Thirty-one species, scattered over the warmer parts of Europe, the Cape of Good Hope, and America. The only cultivated species is scorzonera Hispanica, Spanish scorzonera, or garden viper's-grass. Stem branched; leaves clasping the stem, lanceolate, entire, slightly serrulate at the base; root carrot-shaped, flowers yellow. The roots are sometimes employed medicinally as an alexipharmic; and in hypochondriacal disorders and obstructions of the viscera.

SCOT. *s.* (*écot*, Fr.) 1. Shot; payment. 2. Scot *and Lot.* Parish payments (*Prior*).

To SCOTCH. *v. a.* To cut with shallow incisions (*Shakspeare*).

Scotch. *s.* (from the verb.) A slight cut; a shallow incision (*Walton*).

Scotch collops, or Scotched collops. *s.* Veal cut into small pieces.

Scotch hoppers. *s.* A play in which boys hop over lines in the ground (*Locke*).

Scotch-scale, in music, a scale differing from that of the other nations of Europe by its omission of the fourth and seventh; a peculiarity from which all the genuine Scottish melodies derive their national and distinguished character. This scale is supposed by some writers to be the same with the original enharmonic scale of the ancient Greeks.

Scotch fir. See Pinus.

Scotch kale. See Brassica.

SCOTISTS, a sect of school divines and philosophers; thus called from their founder, J. Duns Scotus, a Scottish, or, as others say, an Irish cordelier; who, in the fourteenth century, maintained the immaculate conception of the Virgin, or that she was born without original sin; in opposition to Thomas Aquinas, and the Thomists. As to philosophy, the Scotists were, like the Thomists, Peripatetics; only distinguished by this, that in each being, as many different qualities as it had, so many different formalities did they distinguish; all distinct from the body itself, and making, as it were, so many different entities; only these were metaphysical, and, as it were, superadded to the being.

SCOTLAND, or North Britain, the northern of the two kingdoms into which the island of Great Britain was formerly divided. It is bounded on the W. by the Atlantic ocean, N. by the North sea, E. by the German ocean, S.E. by England, and S. by the Irish sea. To Scotland also appertain the islands on

its western coast, called the Hebrides, or Western islands, and those to the N.E. called the Orkney and Shetland islands. From N. to S. it extends 270 miles; and its greatest breadth is 150, but in some places not above 30, and no part is distant above 40 miles from the coast. It contains about 17,788,000 acres; and the number of inhabitants, in 1801, was 1,599,068. Scotland is divided into two districts, the Highlands and the Lowlands; the former is applied to the mountainous part to the N. and N.W. and the latter to the more level district on the E. and S.E. But nature seems to have pointed out three grand divisions in Scotland. The first, or North division, is formed by a chain of lakes, which cross the country, from the frith of Murray to the island of Mull, in a S.W. direction; the second, or Middle division, is bounded on the S. by the friths of Forth and Clyde, and the great canal by which they are united; and on the S. side of this boundary is the third or South division. The north division is chiefly an assemblage of vast dreary mountains; not, however, without some vertile valleys on the northern and eastern shores. The middle division is traversed, in different directions, by many great ranges of mountains: and though cultivation here is also found chiefly on the eastern shore, yet of this division, as well as of the former, the arable land bears a small proportion to the mountainous and barren tracts. The south division has a great resemblance to England, and with respect both to the general aspect of the country, and to the progress of cultivation, exhibits every kind of rural variety. The principal rivers are the Spey, Don, Tay, Tweed, Clyde, Forth, Northern Dee, Esk, Annan, Nith, and Southern Dee. The lochs or lakes are numerous, and some of them extensive. On the west and north coasts are innumerable islands: the three principal ranges or clusters of which are called Western Islands, Shetland Islands, and Orkney Islands. The climate of Scotland is various in different places. The northern extremity, which is on the same parallel of latitude with some parts of Norway, is very cold; but the frosts are much less intense here than in any part of the continent equally far north; an advantage arising from an insular situation. The whole west coast is subjected to frequent summer rains, and sudden changes in the atmosphere, equally unfavourable to the ripening and gathering in of the products of the earth. The climate in many places on the eastern coast, and in the whole south division, is not inferior to that of the northern part of England. The air in Scotland is in general healthy. The produce of the soil in the northern parts of Scotland and its isles is not considerable; but lime-stone, shell-sand, and marl, those rich manures, are found in great plenty in different places; even the rocky shores produce abundance of kelp, an article of considerable importance in several manufactures. The fisheries in the surrounding seas have long been an object of national importance. When increasing commerce shall enable the inhabitants to form roads, erect towns, and open canals in those remote parts of the country, these fisheries may become a real source of wealth to the nation. The products of Scotland in general are, however, multifarious and valuable. It feeds vast herds of cattle, and its hills are covered with sheep. It produces much grain and flax. Its woods of oak and fir might furnish masts and timber for the use of the British navy. Its mines are rich in coal, in lead, and in iron. Freestone, lime-stone, and slate, are found in abundance. Neither Greece nor Italy can boast a greater store of beautiful marble; fine rock crystals, pearls, and variegated pebbles, are not uncommon. Its rivers and lakes are richly stored with salmon and trout, and a variety of other fishes. The Scottish mountains, in former times, were infested by the wolf and bear, but happily these ferocious animals have long been extirpated. The wild ox was also an inhabitant of the Caledonian forest. Herds of wild roes, to this day, range at large in the northern mountains; and the stag is often seen in the woods. There, too, the beautiful bird called capercailzie, or cock of the wood, is sometimes found. The summits are the haunt of the ptarmigan, the eagle, the falcon, and the Alpine hare. Black game and grouse swarm among the heaths: among the wild animals which Scotland possesses, in common with England, are the fox, the badger, the otter, the hedgehog, the hare and rabbit, the weazel, the mole, and other small quadrupeds; the partridge, the quail, the snipe, the plover, and many other birds. The cattle and sheep are small, but much valued for the delicacy of their flesh; and the fleece of the Scottish sheep often equals the finest Spanish wool. Though the cattle in the high grounds be diminutive, yet in many parts of the country the horses and cows are not inferior in size and beauty to those of the English breed.

The trade and population of the great towns have considerably increased of late. Some districts, however, on the western shores especially, are almost depopulated. Whole colonies have at once forsaken their native shores; and the country is annually drained of its inhabitants, by the emigration of individuals, tempted by the view of riches. It has thence been conjectured, that the number of inhabitants in Scotland has decreased considerably within a century. However that may be, the improvements, the industry, and the riches lately introduced into Scotland, form a striking contrast with the poverty of former times. This favourable change may be considered as the effect of those liberal principles, and enlightened views, for which many spirited friends of Scotland are at present so eminently distinguished. Scotland is divided into 33 shires or counties, the names of which are Aberdeen, Angus or Forfar, Argyle, Ayr, Banff, Berwick, Bute, Caithness, Clackmannan, Cromarty, Dumbarton, Dumfries, Edinburgh, Fife, Haddington, Inverness, Kincardine, Kinross, Kirkcudbright, Lanerk, Linlithgow, Murray or Elgin, Nairn, Orkney, Peebles, Perth, Renfrew, Ross, Roxburgh,

Selkirk, Sterling, Sutherland, and Wigton. It is probable that Scotland, like the other nations of Europe, was first governed by a number of petty princes, before the whole country became subject to the dominion of one sovereign. At what time this event took place, it is impossible to ascertain with any degree of certainty; but there seems to be no doubt that the Scottish monarchy existed from a very remote period. According to historians, Fergus, commonly called the first king of Scotland, reigned 330 years before Christ, though later critics have considered the first 44 kings as imaginary, and begin the history with Fergus the second, the son of Erth, who is said to have been king of the Scots about the year 400. That Scotland was governed by a king at the time of the Romans visiting England, is certain; and it continued an independent kingdom till the death of the English queen Elizabeth, when James VI. the most immediate heir, was called to the throne of England, and constantly resided in the latter: he and his successors calling themselves kings of England and Scotland; each country having a separate parliament, till, in the reign of queen Ann, both kingdoms were united, under the general name of Great Britain: sixteen peers being elected to represent the nobility, and sixteen members being chosen to represent the counties and boroughs in the same general parliament with England. After the revolution, which changed the succession from the house of Stuart, this unfortunate family had many adherents in this part of the kingdom, and two attempts were made in their favour in the years 1715 and 1745, which ended in the ruin of the projectors: that family is now virtually extinct. There are five universities in Scotland, viz. St. Andrew's, Glasgow, Edinburgh, New Aberdeen, and Old Aberdeen. The religion is presbyterian in point of government, and calvinistic in point of doctrine, being thus established soon after the reformation. There are few Roman Catholics, nor are the episcopalians numerous.—Before the reformation, Scotland contained two archbishoprics, St. Andrew and Glasgow, and twelve bishoprics, Aberdeen, Argyle, Brechen, Caithness, Dumblain, Dunkeld, Edinburgh, Galloway, the isles of Murray, Orkney, and Ross.

The population of the Scotch counties, as well as of the principal town in each, is thus given by Mr. Myers, in his System of Geography, lately published.

Northern Division.

Counties.	*Population.*	*Chief Towns.*	*Population.*
Orkney and Shetland	46,842	Kirkwall	2,621
Sutherland	23,117	Dornock	2,368
Caithness	22,609	Wick	3,986
Ross-shire	52,291	Dingwall	1,418
Cromarty	5,590	Cromarty	2,208
Inverness	74,292	Inverness	8,732

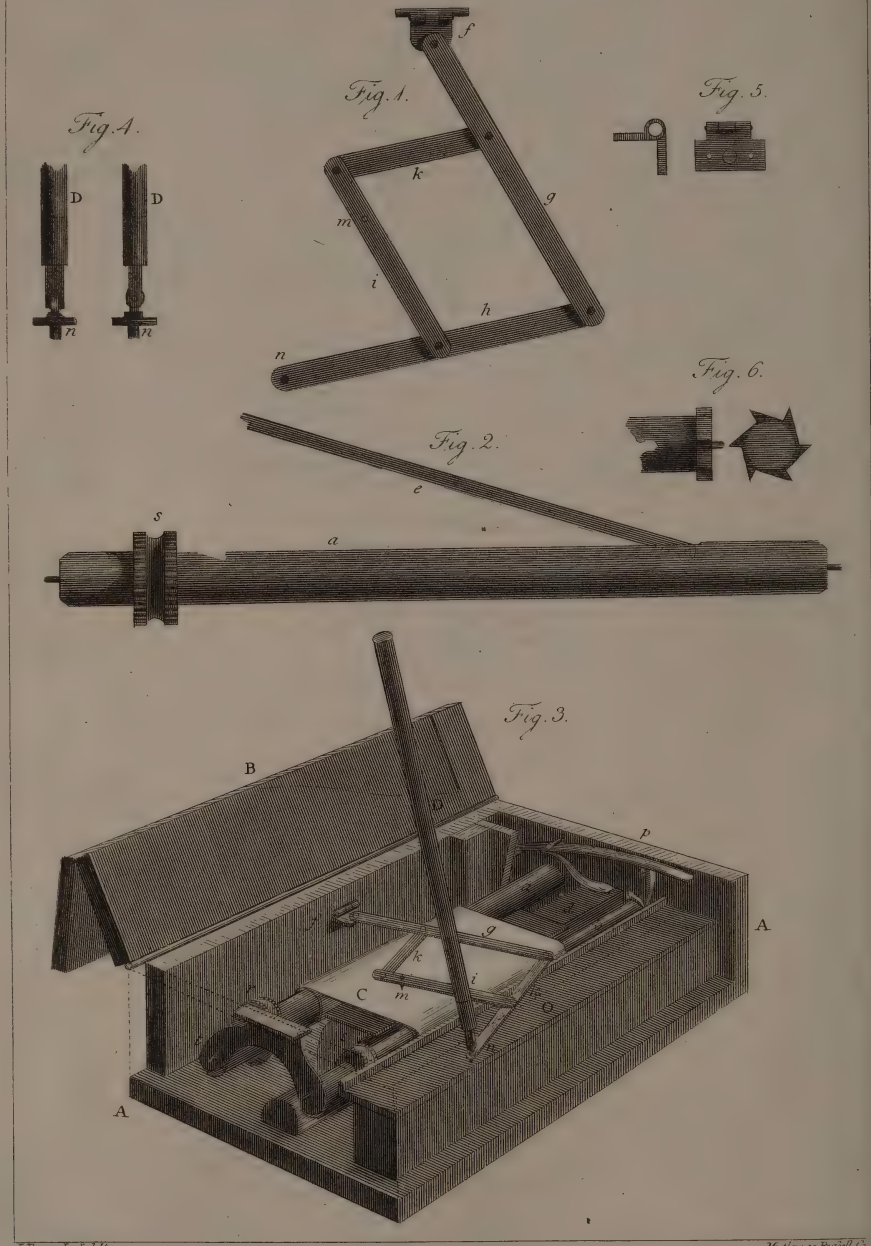
Middle Division.

Nairn	8,257	Nairn	2,215
Murray or Elgin	26,705	Elgin	4,345
Banff	37,487	Banff	3,571
Aberdeen	123,082	Aberdeen	17,597
Argyle	76,850	Inverary	2,045
Perth	126,366	Perth	14,878
Angus or Forfar	99,127	Montrose	7,974
Mearns	26,349	Bervie	1,068
Bute	11,791	Rothsay	5,231
Dumbarton or Lenox	20,710	Dumbarton	2,549
Stirling	50,825	Stirling	5,256
Clackmannan	10,858	Clackmannan	2,961
Kinross	6,725	Kinross	2,124
Fife	93,743	St. Andrews	4,566

Southern Division.

Ayr	84,306	Ayr	5,492
Renfrew	78,058	Renfrew	2,031
Lanark	146,699	Glasgow	77,385
Linlithgow, or West Lothian	17,844	Linlithgow	3,594
Peebles	8,735	Peebles	2,088
Edinburgh, or Mid Lothian	122,954	Edinburgh	82,560
Haddington, or East Lothian	29,986	Haddington	4,049
Berwick	30,621	Dunse	3,157
Wigton	22,918	Wigton	1,475
Kirkcudbright	29,211	Kirkcudbright	2,380
Dumfries	54,547	Dumfries	7,288
Selkirk	5,070	Selkirk	2,098
Roxburgh	33,682	Jedburgh	3,834

SCOTOGRAPH.



J. Farey, Jun.r del.t

Mutlow sc. Rugeley Co.

London, Published by Sherwood & Co.r Paternoster Row, Sept.r 1.st 1812.

SCOTLAND (New). See NOVA SCOTIA.

SCOTOGRAPH, an ingenious little instrument, invented by Mr. John Isaac Hawkins, to enable any person to write short memorandums in the dark, or when travelling in a coach; also for blind people.

Plate 153 is appropriated to the explanation of this contrivance. Fig. 3 is a perspective view of the whole, which is contained in a small box AA, two sides of which are removed to shew the interior; the lid B is made to fold in two halves:—*a b*, are two small wooden rollers, placed parallel to each other, in the length of the box; the paper *c*, to receive the writing, is rolled upon these two rollers, one end being fastened to each by a small lever *e*, fig. 2, which shuts down into a groove in the roller, and pressing the paper into the groove under it, holds the end fast. In extending from one roller to the other, the paper passes over a small block *d*, which supports it while it is written upon; this is performed by a small pantograph, in which the principle of the instrument consists. The pencil or stile D, which is held in the hand to write, describes a very large character, while the writing point reduces the characters to half the size, by which means any irregularities, made by writing in the dark, are avoided, or at least diminished one half. The pantograph is fitted with a joint, to a hinge *f*, shewn separately in fig. 5, at the back of the box, so that it can be turned up to read the paper beneath it. Four bars, *g*, *h*, *i*, and *k*, fig. 1. compose the pantograph; the fixed center being at *f*, in the end of *g*; the tracing point at *m*, and the writing point at *n*, is exactly in a line with the former. Now, by this arrangement of the four bars, the point *m* will always remain in this same line, in any position of the four rulers, and will always be at half the distance from the center *f*; therefore, on the simple property of the lever, it will follow, that *m* will always describe similar figures to *n* and half the size. The writing is performed by the stile D being traced over the surface of a small plate of brass *o*, fig. 3, fixed across the box: it has a small edge projecting up to regulate the height of the letters. To use the instrument, begin at the end of the shelf, and trace a large character upon the brass *o*, bearing on as hard as is required: when all the length of the box is written, the stile D is returned to the end, and its point pressed down upon the end of a detent *p*, fig. 3, which has a spur or claw engaging one of the teeth of a ratchet wheel (see fig. 6), fixed on one end of the roller 6. This turns the roller round sufficiently to advance the paper *o*, the breadth of another line, which is then written in the same manner as the first. The detent *p*, is returned by a spring, and its spur takes another tooth of the ratchet wheel ready to act again. The writing point *m*, is a small piece of silver wire fixed into the bar *i* of the pantagraph, and pressing upon the paper *c*, which is slightly chalked, to cause the silver to mark.

Fig. 4 represents two views of the joint *n*, at the end of the stile D, which is an universal joint, that the hand may not be cramped in writing with it. The lid B is folded down, being half shut when in use, and then the half lid supports the hand while writing.

To read the paper, the rollers are provided with small thumb nuts *r s*, by which they can be turned round to bring any line into view; and the piece of brass *t* (fig. 3), which supports the pivots at the end of them, springs them endways, and causes a friction, which retains them wherever they are set.

SCO'TOMY. *s.* (σκοτωμα.) A dizziness in the head, causing dimness of sight (*Ainsw.*).

SCO'VEL. *s.* (*scopa*, Lat.) A mop of clouts for sweeping an oven; a maulkin (*Ainsworth*).

SCO'UNDREL. *s.* (*scondaruolo*, Italian.) A mean rascal; a low petty villain (*Pope*).

To SCOUR. *v. a.* (*skurer*, Danish; *scheueren*, Dutch.) 1. To rub hard with any thing rough, in order to cleanse the surface (*Arbuthnot*). 2. To purge violently. 3. To cleanse; to bleach (*Walton*). 4. To remove by scouring (*Shakspeare*). 5. (*scorrere*, Italian.) To range about in order to catch or drive away something; to clear away (*Sidney*). 6. To pass swiftly over (*Dryden*).

To SCOUR. *v. n.* 1. To perform the office of cleaning domestic utensils (*Shakspeare*). 2. To clean (*Bacon*). 3. To be purged or lax (*Graunt*). 4. To rove; to range (*Knolles*). 5. To run here and there (*Shakspeare*). 6. To run with great eagerness and swiftness; to scamper (*Collier*).

SCO'URER. *s.* (from *scour.*) 1. One that cleans by rubbing. 2. A purge, rough and quick. 3. One who runs swiftly.

SCOURGE. *s.* (*escourgée*, Fr. *scorreggia*, Italian.) 1. A whip; a lash; an instrument of discipline (*Milton*). 2. A punishment; a vindictive affliction (*Shakspeare*). 3. One that afflicts, harasses or destroys (*Atterbury*). 4. A whip for a top (*Locke*).

To SCOURGE. *v. n.* (from the noun). 1. To lash with a whip; to whip (*Watts*). 2. To punish; to chastise; to chasten; to castigate with any affliction (*Maccabees*).

SCO'URGER. *s.* (from *scourge.*) One that scourges; a punisher or chastiser.

SCOURING. A horse is said to have a scouring, when the body labours under a continued looseness, similar to a course of purgation, without any perceptible cause. Fluey carcased horses are peculiarly liable to this disorder.

To SCOURSE. *v. a.* To exchange one thing for another; to swap (*Ainsworth*).

SCOUT. *s.* (*escoute*, from *escouter*, Fr.) One who is sent privily to observe the motions of the enemy (*Wilkins*).

To SCOUT. *v. n.* (from the noun.) 1. To go out in order to observe the motions of an enemy privately (*Dryden*). 2. To ridicule; to sneer. A vulgar use.

To SCOWL. *v. n.* (*scylian*, to squint, Sax.) To frown; to pout; to look angry, sour, or sullen (*Sidney. Crashaw*).

SCOWL. *s.* (from the verb.) Look of sullenness or discontent; gloom (*Crashaw*).

SCO'WLINGLY. *ad.* (from *scowl.*) With a frowning and sullen look.

To SCRA'BBLE. *v. n.* (*krabbelen, scraffelen,* to scrape or scratch, Dutch.) To paw with the hands (*Samuel*).

SCRAG. *s.* (*scraghe,* Dutch.) Any thing thin or lean.

SCRA'GGED. *a.* (corrupted from *craggy.*) Rough; uneven; full of protuberances or asperities (*Bentley*).

SCRA'GGEDNESS. SCRA'GGINESS. *s.* (from *scragged,* and *scraggy.*) 1. Leanness; marcour. 2. Unevenness; roughness; ruggedness.

SCRA'GGY. *a.* (from *scrag.*) 1. Lean; marcid; thin (*Arbuthnot*). 2. Rough; rugged; uneven (*Philips*).

To SCRA'MBLE. *v. n.* (the same with *scrabble*; *scraffelen,* Dutch.) 1. To catch at any thing eagerly and tumultuously with the hands; to catch with haste preventive of another (*Stillingfleet*). 2. To climb by the help of the hands.

SCRA'MBLE. *s.* (from the verb.) 1. Eager contest for something (*Locke*). 2. Act of climbing by the help of the hands.

SCRA'MBLER. *s.* (from *scramble.*) 1. One that scrambles (*Addison*). 2. One that climbs by the help of the hands.

To SCRANCH. *v. a.* (*scrantzer,* Dutch.) To grind somewhat crackling between the teeth.

SCRA'NNEL. *a.* Vile; worthless (*Milton*).

SCRAP. *s.* (from *scrape,* a thing scraped or rubbed off.) 1. A small particle; a little piece; a fragment (*L'Estrange*). 2. Crumb; small particles of meat left at the table (*Bacon. Granville*). 3. A small piece of paper (*Pope*).

To SCRAPE. *v. a.* (*schrapen,* Dutch.) 1. To deprive of the surface by the light action of a sharp instrument (*Moxon*). 2. To take away by scraping; to erase (*Swift*). 3. To act upon any surface with a harsh noise (*Pope*). 4. To gather by great efforts, or penurious or trifling diligence (*South*).

To SCRAPE. *v. a.* 1. To make a harsh noise. 2. To play ill on a fiddle. 3. To make an awkward bow (*Ainsworth*). 4. *To* SCRAPE *Acquaintance.* A low phrase. To curry favour, or insinuate into one's familiarity.

SCRAPE. *s.* (*skrap,* Swedish.) 1. Difficulty; perplexity; distress. 2. The sound of the foot drawn over the floor. 3. A bow.

SCRA'PER. *s.* (from *scrape.*) 1. Instrument with which any thing is scraped (*Swift*). 2. A miser; a man intent on getting money; a scrape-penny (*Herbert*). 3. A vile fiddler (*Cowley*).

SCRAT. *s.* (ɾcɾuꝛꝛa, Sax.) A hermaphrodite.

To SCRATCH. *v. a.* (*kratzen,* Dutch.) 1. To tear or mark with slight incisions ragged and uneven (*Grew*). 2. To tear with the nails (*More*). 3. To wound slightly. 4. To hurt slightly with any thing pointed or keen (*Shakspeare*). 5. To rub with the nails (*Camden*). 6. To write or draw awkwardly (*Swift*).

SCRATCH. *s.* (from the verb.) 1. An incision ragged and shallow (*Newton*). 2. Laceration with the nails (*Prior*). 3. A slight wound (*Sidney*).

SCRA'TCHER. *s.* He that scratches.

SCRATCHES. Cracks in the heels of a horse, originally produced by changes of weather, and his being left with wet heels in the winter season. These, when long neglected, become virulent; and, from small and almost imperceptible cracks, enlarge to clefts with ragged edges, acquiring, by degrees, a kind of fungous callosity. From these a fetid oily ichor is discharged, attended with an inflamed tension of the fetlock-joints, and such perpetual pain, that the horse is unwilling to move in his stall; and when a leg is lifted from the ground, he suspends it for some time, in a seeming state of misery, from the fear of putting it down again. The cure consists solely in fomentations of warm, well-boiled, gelatinous gruel, with a sponge; followed by linseed poultices; dressings of digestive ointment; a few diuretic balls, given three days apart; and, lastly, a course of alterative powders, to correct the acrimony of the blood.

SCRA'TCHINGLY. *ad.* (from *scratching.*) With the action of scratching (*Sidney*).

SCRATCH-PANS, in the English saltworks, a name given to certain leaden pans, which are usually made about a foot and a half long, a foot broad, and three inches deep, with a bow or circular handle of iron, by which they may be drawn out with a hook when the liquor in the pan is boiling. Their use is to receive a selenitic matter, known by the name of soft scratch, which falls during the evaporation of the salt water.

SCRAW. *s.* (Irish.) Surface or scurf (*Swift*).

To SCRAWL. *v. a.* (corrupted from *scrabble.*) To draw or mark irregularly or clumsily (*Swift*).

To SCRAWL. *v. n.* 1. To write unskilfully and inelegantly (*Swift*). 2. (from *crawl.*) To creep like a reptile (*Ainsworth*).

SCRAWL. *s.* (from the verb.) Unskilful and inelegant writing (*Arbuthnot*).

SCRA'WLER. *s.* (from *scrawl.*) A clumsy and inelegant writer.

SCRAY. *s.* A bird called a sea-swallow (*Ainsworth*).

SCRE'ABLE. *a.* (*screabilis,* Latin.) That may be spit out (*Bailey*).

To SCREAK. *v. n.* (properly *creak* or *shriek.*) To make a shrill or loud noise (*Bailey*).

To SCREAM. *v. n.* (hneman, Saxon.) 1. To cry out, as in terrour or anguish (*Swift*). 2. To cry shrilly (*Shakspeare*).

SCREAM. *s.* (from the verb.) A shrill, quick, loud cry of terrour or pain (*Pope*).

SCREAMER, in ornithology. See PALAMEDEA.

To SCREECH. *v. n.* (*skriekia,* to cry, Islan.) 1. To cry out in terrour or anguish (*Bacon*). 2. To cry as a night owl.

SCREECH. *s.* (from the verb.) 1. Cry of horrour and anguish. 2. Harsh cry (*Pope*).

SCREECH-OWL. See STRIX.

SCREED, with plasterers, is the floated work behind a cornice, and is only necessary when a cornice is to be executed without bracketing.

SCREEN. *s.* (*escran*, French.) 1. Any thing that affords shelter or concealment (*Bacon*). 2. Any thing used to exclude cold or light. 3. A riddle to sift sand, corn, &c.

To SCREEN. *v. a.* (from the noun.) 1. To shelter; to conceal; to hide (*Rowe*). 2. To sift; to riddle (*Evelyn*).

SCREW, or SCRUE, one of the six mechanical powers; chiefly used in pressing or squeezing bodies close, though sometimes also in raising weights.

The screw is a spiral thread or groove cut round a cylinder, and every where making the same angle with the length of it. So that if the surface of the cylinder, with this spiral thread upon it, were unfolded and stretched into a plane, the spiral thread would form a straight inclined plane, whose length would be to its height as the circumference of the cylinder is to the distance between two threads of the screw: as is evident by considering, that in making one round, the spiral rises along the cylinder the distance between the two threads.

Hence the threads of a screw may be traced upon the smooth surface of a cylinder thus: Cut a sheet of paper into the form of a right-angled triangle, having its base to its height in the above proportion, viz. as the circumference of the cylinder of the screw is to the intended distance between two threads; then wrap this paper triangle about the cylinder, and the hypothenuse of it will trace out the line of the spiral thread.

When the spiral thread is upon the outside of a cylinder, the screw is said to be a male one. But if the thread be cut along the inner surface of a hollow cylinder, or a round perforation, it is said to be female. And this latter is also sometimes called the box or nut.

When motion is to be given to something, the male and female screw are necessarily conjoined; that is, whenever the screw is to be used as a simple engine, or mechanical power. But when joined with an axis in peritrochio, there is no occasion for a female; but in that case it becomes part of a compound engine.

The screw cannot properly be called a simple machine, because it is never used without the application of a lever, or winch, to assist in turning it.

Of the Force and Power of the Screw.

1. The force of a power applied to turn a screw round, is to the force with which it presses upwards or downwards, setting aside the friction, as the distance between two threads is to the circumference where the power is applied.

For, the screw being only an inclined plane, or half wedge, whose height is the distance between two threads, and its base the said circumference; and the force in the horizontal direction being to that in the vertical one as the lines perpendicular to them, viz. as the height of the plane, or distance of the two threads, is to the base of the plane, or circumference at the place where the power is applied; therefore the power is to the pressure, as the distance of two threads is to that circumference.

2. Hence, when the screw is put in motion, then the power is to the weight which would keep it in equilibrio, as the velocity of the latter is to that of the former. And hence their two momenta are equal, which are produced by multiplying each weight or power by its own velocity. Two different forms of screw presses are shewn at figs. 1, 2, pl. 154.

3. Hence we can easily compute the force of any machine turned by a screw. Let fig. 1 represent a press driven by a screw, whose threads are each a quarter of an inch asunder; and let the screw be turned by a handle four feet long from C to D; then if the natural force of a man, by which he can lift, or pull, or draw, be 150 pounds; and it be required to determine with what force the screw will press on the board, when the man turns the handle at C and D with his whole force. The diameter CD of the power being 4 feet, or 48 inches, its circumference is $48 \times 3{\cdot}1416$ or $150\frac{4}{5}$ nearly; and the distance of the threads being $\frac{1}{4}$ of an inch; therefore the power is to the pressure, as $\frac{1}{4}$ to $150\frac{4}{5}$ or as 1 to $603\frac{1}{5}$: but the power is equal to 150lb; therefore as $1 : 603\frac{1}{5} :: 150 : 90{\cdot}480$; and, consequently, the pressure at the bottom of the screw is equal to a weight of $90{\cdot}480$ pounds, independent of friction.

But the power has to overcome not only the weight or other resistance, but also the friction of the screw, which in this machine is very great, in some cases equal to the weight itself, since it is sometimes sufficient to sustain the weight when the power is taken off.

Mr. Hunter has described a new method of applying the screw with advantage in particular cases, in the Philos. Trans. vol. 71, p. 58, &c. or Gregory's Mechanics, vol. 1, pp. 98—100. This method is adopted with great advantage in corkscrews, &c.

SCREW (The Endless), or PERPETUAL SCREW, is one which works in and turns a dented wheel DF, fig. 3, without a concave or female screw; being so called because it may be turned for ever without coming to an end. From the schemes in the plate it is evident, that while the screw turns once round, the wheel only advances the distance of one tooth.

1. If the power applied to the lever or handle of an endless screw AB, be to the weight in a ratio compounded of the periphery of the axis of the wheel EH, to the periphery described by the power in turning the handle, and of the revolutions of the wheel DF to the revolutions of the screw CB, the power will balance the weight. Hence,

2. As the motion of the wheel is very slow, a small power may raise a very great weight, by means of an endless screw. And therefore the chief use of such a screw is, either where a great weight is to be raised through a little space; or where only a slow gentle motion is

wanted. For which reason it is very useful in clocks and watches.

3. Having given the number of teeth, the distance of the power from the centre of the screw B, the radius of the axis HE, and the power; to find the weight it will raise. Multiply the distance of the power from the centre of the screw AB, by the number of the teeth, and the product will be the space passed through by the power, while the weight passes through a space equal to the periphery of the axis: then say, as the radius of the axis is to the space of the power just found, so is the power to a 4th proportional, which will be the weight the power is able to sustain. Thus, if AB = 3, the radius of the axis HE = 1, the power 150 pounds, and the number of teeth of the wheel DF 48; then the weight will be found = 21,600 = 3 × 150 × 48. Whence it appears that the endless screw exceeds all others in increasing the force of a power.

4. A machine for shewing the power of the screw may be contrived in the following manner. Let the wheel C, fig. 4, pl. 154, have a screw *ab* on its axis, working in the teeth of the wheel D, which suppose to be 48 in number. It is plain, that for every revolution of the wheel C, and screw *ab*, by the winch A, the wheel D will be moved one tooth by the screw; and, therefore, in 48 revolutions of the winch, the wheel D will be turned once round. Then if the circumference of a circle, described by the handle of the winch, be equal to the circumference of a groove *e* round the wheel D, the velocity of the handle will be 48 times as great as the velocity of any given point in the groove. Consequently, when a line G goes round the groove *e*, and has a weight of 48lb. hung to it below the pedestal EF, a power equal to one pound at the handle will balance and support the weight.

SCREW (Archimedes's), or the WATER-SNAIL, is a machine for raising water, which consists either of a pipe wound spirally round a cylinder, fig. 5, pl. 154, or of one or more spiral excavations formed by means of spiral projections from an internal cylinder, covered by an external coating, so as to be water tight. This screw is one of the most ancient, and, at the same time, ingenious machines we know, being truly worthy of the name it bears, supposing Archimedes to be the real inventor. Though simple in its general manner of operation, its theory is attended with some difficulties which could only be conquered by the modern analysis: it was first stated correctly, as far as we have been able to ascertain, by M. Pitot, in the Memoires de l'Academie Royale des Sciences, and afterwards more elaborately by Euler, in Nov. Comment. Petropol. tom. 5. Later attempts by Langsdorf, in his Handbuch der Maschinenlehre, and some other authors, are not to be relied on. That the nature of this curious machine may be the better understood, we shall here state generally its manner of operation.

1. If we conceive that a flexible tube is rolled regularly about a cylinder from one end to the other, this tube or canal will be a screw or spiral, of which we suppose the intervals of the spires or threads to be equal. The cylinder being placed with its axis in a vertical position, if we put in at the upper end of the spiral tube a small ball of heavy matter which may move freely, it is certain that it will follow all the turnings of the screw from the top to the bottom of the cylinder, descending always as it would have done had it fallen in a right line along the axis of the cylinder, only it would occupy more time in running through the spiral. If the cylinder were placed with its axis horizontally, and we again put the ball into one opening of the canal, it will descend following the direction of the first demi-spire, but when it arrives at the lowest point in this portion of the tube, it will stop. It must be remarked, that though its heaviness has no other tendency than to make it descend in the demi-spire, the oblique position of the tube with respect to the horizon is the cause that the ball, by always descending, is always advancing from the extremity of the cylinder whence it commenced its motion, to the other extremity. It is impossible that the ball can ever advance more towards the farther, or, as we shall call it, the second extremity of the cylinder, if the cylinder, placed horizontally, remains always immoveable: but, if when the ball is arrived at the bottom of the first demi-spire, we cause the cylinder to turn on its axis without changing the position of that axis, and in such manner that the lowest point of the demi-spire on which the ball presses becomes elevated, then the ball falls necessarily from this point upon that which succeeds, and which becomes lowest; and since this second point is more advanced towards the second extremity of the cylinder than the former was, therefore, by this new descent, the ball will be advanced towards that extremity, and so on throughout, in such a manner that it will at length arrive at the second extremity, by always descending, the cylinder having its rotatory motion continued. Moreover, the ball, by constantly following its tendency to descend, has advanced through a right line equal to the axis of the cylinder, and this distance is horizontal, because the sides of the cylinder were placed horizontally. But if the cylinder had been placed oblique to the horizon, and we suppose it to be turned on its axis always in the same direction, it is easy to see, that if the first quarter of a spire actually descends, the ball will move from the lower end of the spiral tube, and be carried, solely by gravity, to the lowest point of the first demi-spire, where, as in the preceding case, it will be abandoned by this point as it is elevated by the rotation, and thrown, by its heaviness, upon that which has taken its place: whence, as this succeeding point is farther advanced towards the second extremity of the cylinder than that which the ball occupied just before, and consequently more elevated, therefore the ball, while following its tendency to descend by its heaviness, will be always more and more elevated by vir-

Fig. 1.

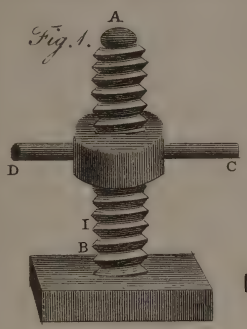


Fig. 2.

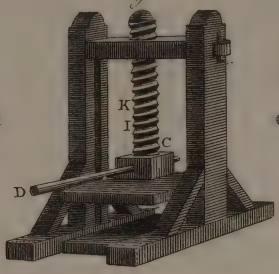


Fig. 3.

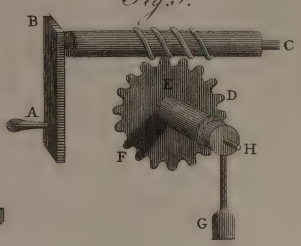
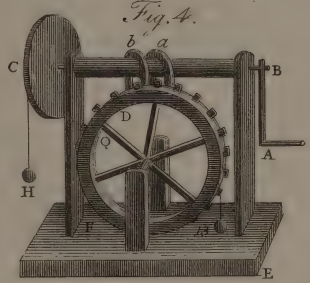
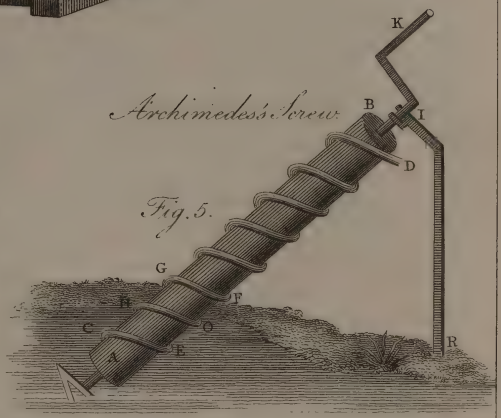


Fig. 4.



Archimedes's Screw

Fig. 5.



Scythe.

Fig. 6.

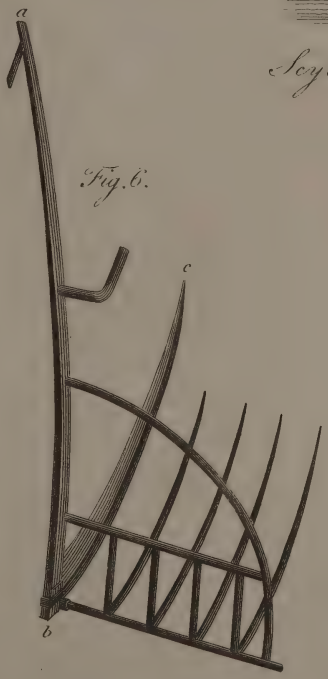
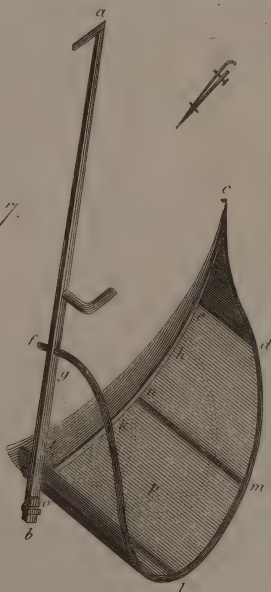


Fig. 7.



Mutlow Sc. Russell Ct.

London, Published by Sherwood & Co. Paternoster Row, Oct.1, 1812.

tue of the rotation of the cylinder. Thus it will, after a certain number of turns, be advanced from one extremity of the tube to the other, or through the whole length of the cylinder; but it will only be raised through the vertical height determined by the obliquity of the position of the cylinder.

Instead of the ball, let us now consider water as entering by the lower extremity of the spiral canal, when immersed in a reservoir: this water descends at first in the canal solely by its gravity; but the cylinder being turned, the water moves on in the canal to occupy the lowest place, and thus, by the continual rotation, is made to advance farther and farther in the spiral, till at length it is raised to the upper extremity of the canal, where it is expelled. There is, however, an essential difference between the water and the ball; for the water, by reason of its fluidity, after having descended by its heaviness to the lowest point of the demi-spire, rises up on the contrary side, to the original level; on which account, more than half one of the spires may soon be filled with the fluid. This is an important particular, which, though it need not be regarded in a popular illustration, must be attended to in the more particular exhibition of the theory.

M. Lamandé, an ingenious French philosopher, has made several experiments in order to ascertain the effects of Archimedes's screw. The screw he employed to raise water was in length, from A to B, 5·85 metres, or 19⅓ feet, and in diameter 0·49 metres, or about 1½ feet. He worked it by two relays of men labouring alternately for two hours each, each relay consisted of nine men, and the handle made 40 turns in a minute. The water raised in an hour was 45 cubic metres, the height to which it was elevated 3·3 metres. The 18 men, therefore, of the two relays, raised, in a day's labour of ten hours, 450 cubic metres to the height of 3·3 metres, or 1485 cubic metres (more than as many cubic yards), to the height of one metre (more than 39 inches). So that each man raised, by means of Archimedes's screw, 82 cubic metres to the height of one metre; while it is known, that he would be capable of raising 111 cubic metres. Hence the ratio of the useful force to the force employed, is $\frac{82}{111}$ or ·74, which measures the effect of the machine.

M. Cagniard, formerly an élevè of the Polytechnic school, has struck out a very ingenious application of Archimedes's screw. He employs it as bellows, in a machine which produces a rotatory motion by means of a reservoir of hot water. When the screw is turned in the direction of the motion of the points which described the helices of which its threads are composed, the water which bathes the lower extremity of the screw does not rise in its threads, but still farther descends below the screw, being replaced by the exterior air which escapes through the orifices of these threads. Thus M. Cagniard causes the air to descend to the bottom of a vessel full of water of the temperature of the atmosphere: another vessel filled with water to 180 or 200° (of Fahrenheit) contains a cylinder which is moveable on its axis, and is entirely immersed in the water: this cylinder is furnished with spouts in the direction of its length. The cold air passes from the bottom of the first vessel to that of the second, by means of a syphon; it enters the spouts of the cylinder, there becomes heated, and forces the cylinder to turn. The rotatory motion of the axis of this cylinder is transmitted to the axis of the Archimedean screw, and the motion of the cylinder is continued solely by the action of the hot water upon the atmospheric air. See Traité des Machines, par Hachette, p. 88; and Gregory's Mechanics, vol. ii. p. 343, &c.

SCREW PINE, in botany. See PANDANUS.

SCREW TREE. See HELICTERES.

To SCREW. *v. a.* (from the noun.) 1. To turn or move by a screw (*Philips*). 2. To fasten with a screw (*Moxon*). 3. To deform by contortions (*Cowley*). 4. To force; to bring by violence (*Howel*). 5. To squeeze; to press. 6. To oppress by extortion (*Swift*).

To SCRI'BBLE. *v. a.* (*scribillo*, Latin.) 1. To fill with artless, or worthless writing (*Milton*). 2. To write without use or elegance.

To SCRI'BBLE. *v. n.* To write without care or beauty (*Bentley. Pope*).

SCRI'BBLE. *s.* Worthless writing (*Boyle*).

SCRI'BBLER. *s.* (from *scribble.*) A petty author; a writer without worth (*Granville*).

SCRIBE. *s.* (*scriba*, Latin.) 1. A writer (*Grew*). 2. A public notary (*Ainsworth*).

SCRIBE, in Hebrew סופר *sopher*, is very common in scripture, and has several significations. It signifies, 1. A clerk, writer, or secretary. This was a very considerable employment in the court of the kings of Judah, in which the scripture often mentions the secretaries as the first officers of the crown. Seraiah was scribe or secretary to king David (2 Sam. viii. 17). Shevah and Shemaiah exercised the same office under the same prince (2 Sam. xx. 25). In Solomon's time we find Elihoreph and Ahiah secretaries to that prince (1 Kings iv. 4). Shebna under Hezekiah (2 Kings xix. 2). And Shaphan under Josiah (2 Kings xxii. 8). As there were but few in those times that could write well, the employment of a scribe or writer was very considerable. 2. A scribe is put for a commissary or muster-master of an army, who makes the review of the troops, keeps the list or roll, and calls them over. Under the reign of Uzziah king of Judah, there is found Jeil the scribe, who had under his hand the king's armies (2 Chr. xxvi. 11). And at the time of the captivity, it is said the captain of the guard, among other considerable persons, took the principal scribe of the host, or secretary at war, which mustered the people of the land (2 Kings xxv. 19). 3. Scribe is put for an able and skilful man, a doctor of the law, a man of learning that understands affairs. Jonathan, David's uncle by the father's side was a counsellor, a wise man, and a scribe (1 Chr. xxvii. 32). Baruch, the disciple and

secretary to Jeremiah, is called a scribe (Jer. xxxvi. 26). And Ezra is celebrated as a skilful scribe in the law of his God (Ezra vii. 6). The scribes of the people, who are frequently mentioned in the Gospel, were public writers and professed doctors of the law, which they read and explained to the people. Some place the original of scribes under Moses; but their name does not appear till under the Judges. It is said, that in the wars of Barak against Sisera, "out of Machir came down governors, and out of Zebulun they that handle the pen of the writer." (Judges v. 14). Others think that David first instituted them, when he established the several classes of the priests and Levites. The scribes were of the tribe of Levi; and at the time that David is said to have made the regulations in that tribe, we read that 6000 men of them were constituted officers and judges (1 Chr. xxiii. 4); among whom it is reasonable to think the scribes were included. For in 2 Chr. xxiv. 6. we read of Shemaiah the scribe, one of the Levites; and in 2 Chr. xxxiv. 13. we find it written, "Of the Levites that were scribes and officers."

The scribes and doctors of the law, in the scripture phrase, mean the same thing; and he that in Matt. xxii. 35, is called a doctor of the law, or a lawyer, in Mark xii. 28, is named a scribe, or one of the scribes. And as the whole religion of the Jews at that time chiefly consisted in pharisaical traditions, and in the use that was made of them to explain the scripture; the greatest number of the doctors of the law, or of the scribes, were pharisees; and we almost always find them joined together in scripture. Each of them valued themselves upon their knowledge of the law, upon their studying and teaching it, (Matt. xxii. 52): they had the key of knowledge, and sat in Moses's chair (Matt. xxiii. 2). Epiphanius, and the author of the Recognitions imputed to St. Clement, reckoned the scribes among the sects of the Jews; but it is certain they made no sect by themselves; they were only distinguished by their study of the law.

SCRIBONIUS (Largus), an ancient physician in the reign of Augustus or Tiberius, was the author of several works; the best edition of which is that of John Rhodius.

SCRI'MER. *s.* (*escrimeur*, Fr.) A gladiator (*Shakspeare*).

SCRINE. *s.* (*scrinium*, Latin.) A place in which writings or curiosities are deposited (*Spenser*).

SCRIP. *s.* (*skrappa*, Islandic.) 1. A small bag; a satchel (*Milton*). 2. A schedule; a small writing (*Shakspeare*).

SCRI'PPAGE. *s.* (from *scrip.*) That which is contained in a scrip.

SCRI'PTORY. *a.* (*scriptorius*, Lat.) Written; not orally delivered.

SCRI'PTURAL. *a.* (from *scripture.*) Contained in the Bible; biblical (*Atterbury*).

SCRIPTURE is a word derived from the Latin *scriptura*, and in its original sense is of the same import with *writing*, signifying any thing written. It is, however, commonly used to denote the writings of the Old and New Testaments; which are called sometimes the Scriptures, sometimes the sacred or holy Scriptures, and sometimes canonical Scripture. These books are called *the* Scriptures by way of eminence, as they are the most important of all writings; they are said to be holy or sacred on account of the sacred doctrines which they teach; and they are termed canonical, because, when their number and authenticity were ascertained, their names were inserted in ecclesiastical canons, to distinguish them from other books; which, being of no authority, were kept as it were out of sight, and therefore styled apocryphal. See farther, our articles BIBLE, CHRISTIANITY, PENTATEUCH, PROPHECIES, &c. Consult also Paley's Evidences, and Horæ Paulinæ, Watson's Apology for the Bible, Graves on the Pentateuch, Gregory's Letters on the Christian Religion, Gyles on the Authenticity of the New Testament, &c.

SCRIVENER, one who draws contracts, or whole business it is to place money at interest. If a scrivener is entrusted with a bond, he may receive the interest; and if he fails, the obligee shall bear the loss: and so it is if he receive the principal and deliver up the bond; for, being entrusted with the security itself, it must be presumed that he is trusted with power to receive interest or principal; and the giving up the bond on payment of the money shall be a discharge thereof. But if a scrivener shall be entrusted with a mortgage-deed, he hath only authority to receive the interest, not the principal; the giving up the deed in this case not being sufficient to restore the estate, but there must be a reconveyance, &c.

SCROBICULATE. Pitted; having a surface covered with hollows.

SCROBICULUS CORDIS. (*scrobiculus*, of *scrobs*, a ditch.) The pit of the stomach.

SCROFULA. (from *scrofa*, a swine; because this animal is said to be much subject to a similar disorder.) Struma. Scrophula. The king's evil. A genus of diseases in the class cachexiæ and order impetigines of Cullen. Scrofula consists in hard indolent tumors of the conglobate glands in various parts of the body; but particularly in the neck, behind the ears, and under the chin, which after a time suppurate and degenerate into ulcers, from which, instead of pus, a white curdled matter, somewhat resembling the coagulum of milk, is discharged.

The first appearance of the disease is most usually between the third and seventh year of the child's age; but it may arise at any period between these and the age of puberty; after which it seldom makes its first attack. It most commonly affects children of a lax habit, with smooth fine skins, fair hair, and rosy cheeks. It likewise is apt to attack such children as shew a disposition to rachites, and marked by a protuberant forehead, enlarged joints, and a tumid abdomen. Like this disease, it seems to be peculiar to cold and variable climates, being rarely met with in warm

ones. Scrofula is by no means a contagious disease; but, beyond all doubt, is of an hereditary nature, and is often entailed by parents on their children. There are, indeed, some practitioners who wholly deny that this, or any other disease, can be acquired by an hereditary right; but that a peculiar temperament of body, or predisposition in the constitution to some diseases, may extend from both father and mother to their offspring, is very clearly proved. For example, we very frequently meet with gout in young persons of both sexes, who could never have brought it on by intemperance, sensuality, or improper diet, but must have acquired the predisposition to it in this way.

Where there is any predisposition in the constitution to scrofula and the person happens to contract a venereal taint, this frequently excites into action the causes of the former; as a venereal bubo not unfrequently becomes scrofulous, as soon as the virus is destroyed by mercury. The late Dr. Cullen supposed scrofula to depend upon a peculiar constitution of the lymphatic system. The attacks of the disease seem much affected or influenced by the periods of the seasons. They begin usually some time in the winter and spring, and often disappear, or are greatly amended, in summer and autumn. The first appearance of the disorder is commonly in that of small oval or spherical tumors under the skin, unattended by any pain or discolouration. These appear, in general, upon the sides of the neck, below the ear, or under the chin; but in some cases, the joints of the elbows or ankles, or those of the fingers and toes, are the parts first affected. In these instances we do not, however, find small moveable swellings; but, on the contrary, a tumor almost uniformly surrounding the joint, and interrupting its motion.

After some length of time the tumors become larger and more fixed, the skin which covers them acquires a purple or livid colour, and, being much inflamed, they at last suppurate and break into little holes, from which, at first, a matter somewhat puriform oozes out; but this changes by degrees into a kind of viscid serous discharge, much intermixed with small pieces of a white substance, resembling the curd of milk.

The tumors subside gradually, whilst the ulcers at the same time open more, and spread unequally in various directions. After a time, some of the ulcers heal; but the tumors quickly form in different parts of the body, and proceed on, in the same slow manner as the former ones, to suppuration. In this manner the disease goes on for some years, and appearing at last to have exhausted itself, all the ulcers heal up, without being succeeded by any fresh swellings; but leaving behind them an ugly puckering of the skin, and a scar of considerable extent. This is the most mild form under which scrofula ever appears. In more virulent cases, the eyes are particularly the seat of the disease, and are affected with ophthalmia, giving rise to ulcerations in the tarsi, and inflammation of the tunica adnata, terminating not unfrequently in an opacity of the transparent cornea.

In similar cases, the joints become affected, they swell and are incommoded by excruciating deep-seated pain, which is much increased upon the slightest motion. The swelling and pain continuing to increase, the muscles of the limb become at length much wasted. Matter is soon afterwards formed, and this is discharged at small openings made by the bursting of the skin. Being, however, of a peculiar acrimonious nature, it erodes the ligaments and cartilages, and produces a caries of the neighbouring bones. By an absorption of the matter into the system, hectic fever at last arises, and, in the end, often proves fatal.

When scrofula is confined to the external surface, it is by no means attended with danger, although on leaving one part, it is apt to be renewed in others; but when the ulcers are imbued with a sharp acrimony, spread, erode, and become deep, without shewing any disposition to heal; when deep-seated collections of matter form amongst the small bones of the hands and feet, or in the joints; or tubercles in the lungs, with hectic fever, arise, the consequences will be fatal.

On opening the bodies of persons who have died of this disease, many of the viscera are usually found in a diseased state, but more particularly the glands of the mesentery, which are not only much tumefied, but often ulcerated. The lungs are frequently discovered bent, with a number of tubercles or cysts, which contain matter of various kinds. Scrofulous glands, on being examined by dissection, feel somewhat softer to the touch than in their natural state, and when laid open, they are usually found to contain a soft curdy matter, mixed with pus.

SCROLL. *s.* A writing wrapped up.

Scroll, in heraldry. See that article. When the motto relates to the crest, the scroll is properly placed above the achievement; otherwise it should be annexed to the escutcheon. Those of the orders of knighthood are generally placed round shields.

SCROPHULA. See Scrofula.

SCROPHULARIA. Figwort. In botany, a genus of the class didynamia, order angiospermia. Calyx five-cleft; corol somewhat globular, reversed; capsule two-celled. Twenty-five species, natives of warm climates; three indigenous to the moist hedges, or other wet places of our own country. The following are cultivated.

1. S. frutescens. Shrubby figwort. A native of Portugal, with small, very dark purple corol, the lateral segments white.

2. S. trifoliata. Three-leaved figwort; a triennial or perennial of Corsica and Africa; the flowers pedicelled in racemelets, beautifully variegated with red and yellow.

3. S. sambruifolia. Elder-leaved figwort; a native of Portugal, with erect stem and large purple flowers, the lower lip greenish.

4. S. lucida. Shining-leaved figwort. A

native of Naples, with flowers in loose bunches at the sides, and at the top of the stalk of a dark brown colour with a mixture of green. The name scrophularia was given to this genus from an idea that some of the species, and especially the knotty figwort, scrophularia nodosa, found wild in our own hedges, were a specific in scrophula, piles, and other languid tumors.

SCROTAL HERNIA. Hernia scrotalis. A protrusion of any part of an abdominal viscus or viscera into the scrotum. See HERNIA.

SCROTUM. (*quasi scortum*, a skin or hide.) The common integuments which cover the testicles.

SCROYLE. *s.* A mean fellow; a rascal; a wretch (*Shakspeare*).

To SCRUB. *v. a.* (*scrobben*, Dutch.) To rub hard with something coarse and rough (*Swift*).

SCRUB. *s.* (from the noun.) 1. A mean fellow, either as he is supposed to scrub himself for the itch, or as he is employed in the mean offices of scouring away dirt. 2. Any thing mean or despicable (*Swift*). 3. A worn-out broom (*Ainsworth*).

SCRU'BBED. SCRU'BBY. *a.* (*scrubet*, Danish.) Mean; vile; worthless; dirty (*Shakspeare*).

SCRUFF. *s.* The same I suppose, with *scurf*.

SCRU'PLE. *s.* (*scrupule*, Fr. *scrupulus*, Lat.) 1. Doubt; difficulty of determination; perplexity about matters of duty (*Locke*). 2. Twenty grains; the third part of a dram (*Bacon*). 3. Proverbially, any small quantity.

SCRUPLES, in astronomy. *Scruples eclipsed*, that part of the moon's diameter which enters the shadow, expressed in the same measure wherein the apparent diameter of the moon is expressed. See DIGIT.

SCRUPLES OF HALF DURATION, an arch of the moon's orbit, which the moon's centre describes from the beginning of an eclipse to its middle.

SCRUPLES OF IMMERSION, or INCIDENCE, an arch of the moon's orbit, which her centre describes from the beginning of the eclipse, to the time when its centre falls into the shadow. See IMMERSION.

SCRUPLES OF EMERSION, an arch of the moon's orbit, which her centre describes in the time from the first emersion of the moon's limb, to the end of the eclipse.

To SCRU'PLE. *v. n.* (from the noun.) To doubt; to hesitate (*Miltón*).

SCRU'PLER. *s.* (from *scruple*.) A doubter; one who has scruples (*Graunt*).

SCRUPULO'SITY. *s.* (from *scrupulous*.) 1. Doubt; minute and nice doubtfulness (*South*). 2. Fear of acting in any manner; tenderness of conscience (*Decay of Piety*).

SCRU'PULOUS. *a.* (*scrupulosus*, Lat.) 1. Nicely doubtful; hard to satisfy in determinations of conscience (*Locke*). 2. Given to objections; captious (*Shakspeare*). 3. Nice; doubtful (*Bacon*). 4. Careful; vigilant; cautious (*Woodward*).

SCRU'PULOUSLY. *ad.* (from *scrupulous*.) Carefully; nicely; anxiously (*Taylor*).

SCRU'PULOUSNESS. *s.* (from *scrupulous*.) The state of being scrupulous.

SCRU'TABLE. *a.* (from *scrutor*, Latin.) Discoverable by inquiry (*Decay of Piety*).

SCRUTA'TION. *s.* (*scrutor*, Lat.) Search; examination; inquiry.

SCRUTA'TOR. *s.* (*scrutateur*, Fr. from *scruter*, Lat.) Inquirer; searcher; examiner.

SCRUTATORES, among the Romans, certain officers, or servants, whose business it was to search every body that came to salute the emperor, in order to discover if they had any kind of arms concealed about them. They were first instituted under the emperor Claudius.

SCRUTINE'ER. *s.* (*scrutator*, Latin.) A searcher; an examiner.

To SCRU'TINIZE. *To* SCRUTINY. *v. a.* (from *scrutiny*.) To search; to examine (*Ayliffe*).

SCRU'TINOUS. *a.* (from *scrutiny*.) Captious; full of inquiries (*Denham*).

SCRU'TINY. *s.* (*scrutinium*, Latin.) Inquiry; search; examination with nicety (*Taylor*).

SCRUTINY, (*scrutinium*,) in antiquity, an examination, or probation, practised in the last week of Lent, on the catechumens, who were to receive baptism on the Easter-day.

The scrutiny was performed with a great many ceremonies; exorcisms and prayers were made over the heads of the catechumens. On Palm Sunday, the Lord's Prayer and Creed were given them; which they were afterwards made to rehearse.

The process was called *scrutinium*, scrutiny; because hereby the hearts of the catechumens were scrutinized, or searched, that the priests might understand who were fit to be admitted to baptism.

This custom was more in use in the church of Rome than any where else; though it appears, by some missals, to have been likewise used, though much later, in the Gallican church. It is supposed to have ceased about the year 860. Some traces of this practice still remain at Vienne, in Dauphine, and at Liege.

SCRUTINY is also used in the canon law, for a ticket, or little paper billet, wherein, at elections, the electors write their votes privately, so as it may not be known for whom they vote.

SCRUTINY, among us, is chiefly used for a strict perusal and examination of the several votes hastily taken at an election; in order to find out any irregularities committed therein, by unqualified voters, &c.

SCRUTORE, or SCRUTOIR (from the French *escritoire*) a kind of cabinet, with a door or lid opening downwards, for conveniency of writing on, &c.

SCRY, in falconry, denotes a large flock of fowl.

To SCRUSE. *v. a.* To squeeze; to compress (*Spenser*).

To SCUD. *v. n.* (*skutta*, Swedish.) To fly; to run away with precipitation (*Swift*).

SCUDDING, in sea-language, denotes the movement by which a ship is carried precipitately before a tempest. This expedient is never attempted in a contrary wind, unless when the condition of the ship renders her incapable of sustaining the mutual efforts of the waves and wind any longer on her side, without being exposed to the most imminent danger. A ship scuds either with a sail extended on her fore-mast, or, if the storm is excessive, without any sail, which in the sea-phrase is called scudding under bare poles. In sloops and schooners, and other small vessels, the sail employed for this purpose is called the square-sail. In large ships, it is either the fore-sail, at large, reefed, or with its goose-wings extended, according to the degree of the tempest: or it is the fore-top-sail close reefed, and lowered on the cap: which last is particularly used when the sea runs so high as to becalm the fore-sail occasionally; a circumstance which exposes the ship to the danger of broaching-to.

To SCU'DDLE. *v. n.* (from *scud.*) To run with a kind of affected haste or precipitation.

SCU'FFLE. *s.* A confused quarrel; a tumultuous broil (*Decay of Piety*).

To SCU'FFLE. *v. n.* (from the noun.) To fight confusedly and tumultuously (*Drayton*).

To SCULK. *v. n.* (*skulke*, Danish.) To lurk in hiding-places; to lie close (*Prior*).

SCU'LKER. *s.* (from *sculk.*) A lurker; one that hides himself for shame or mischief.

SCULL. *s.* (*skola*, Islandic.) 1. The bone which incases and defends the brain; the arched bone of the head (*Sharp*). 2. A small boat; a cockboat. 3. One who rows a cockboat (*Hudibras*). 4. A shoal of fish (*Milton*).

SCU'LLCAP. *s.* (*scull* and *cap.*) 1 A head-piece. 2. A nightcap.

SCULLCAP, in botany. See SCUTELLARIA.

SCU'LLER. *s.* 1. A cockboat; a boat in which there is but one rower (*Dryden*). 2. One that rows a cockboat.

SCU'LLERY. *s.* (from *skiola*, a vessel, Islandic.) The place where common utensils, as kettles or dishes, are cleaned and kept (*Peacham*).

SCU'LLION. *s.* (from *escueille*, French, a dish.) The lowest domestic servant, that washes the kettles and dishes in the kitchen (*Shakspeare*).

To SCULP. *v. a.* (*sculpo*, Lat.) To carve; to engrave: not in use (*Sandys*).

SCU'LPTILE. *a.* (*sculptilis*, Lat.) Made by carving (*Brown*).

SCU'LPTOR. *s.* (*sculptor*, Lat.) A carver; one who cuts wood or stone into images (*Addison*).

SCULPTURE, (*sculptura*), the art of cutting or carving wood, stone, or other matter, and forming various figures or representations therein; as also of fashioning wax, earth, plaster, &c. to serve as models, or moulds, for the casting of metalline figures.

Sculpture, in its latitude, includes both the art of working en creux, properly called engraving; and of working in relievo, which is what we more strictly call sculpture.

Powers of sculpture.—Sculpture is not only able, in common with other imitative arts, to express the forms of visible objects and the conceptions of the mind, but it possesses this superior distinction, that by means of its various branches, it is eminently capable of transmitting the most durable records of men's actions to distant ages. Were it not for this art, we should at the present moment be ignorant of every event which has distinguished the course of time in the long period of earthly existence; at least our only knowledge would be gathered from tradition, whose fallacy and inaccuracy are every hour evinced. Without this art, we could form no conjecture of the permanency or variation even of human forms, much less of human passions and taste; nor is it to be forgotten, that the first communication of the laws of God was made to the Israelites by the means of sculpture.

The art of sculpture, like its sister painting, is imitative, not for the gratification of the eye only, but also of the intellect. It is capable of expressing all forms that fall under our inspection, and also of conveying more select expressions of beauty than are to be found, either by ordinary observation, or are generally united in one body, and which are therefore called ideal forms.

Sculpture, in its confined and proper sense (in which we here propose to treat of it), divides itself into the carving of bas-reliefs, and of statues, or groups: and its productions may be classed generally, like those of painting, under the respective terms, historical, allegorical, portraiture, &c. See PAINTING.

Bas-relief has been already described (see RELIEVO). Works of this kind seem to have been invented for the purpose of representing subjects of history or fancy, and may be regarded as a species of painting in stone. They are chiefly used to adorn the pediments, friezes, and pannels of buildings, as well as the pedestals of statues, &c.

Statues are defined to be figures in full or insulated relievo. They are of various descriptions. (See STATUES.) They have chiefly been employed for the purposes of religious worship, as among the heathen nations and the Roman-catholics; and for the commemoration of heroic characters, or of men distinguished by any remarkable achievements.

Groups are an assemblage and union of statues, and are generally employed to the same purposes as single statues.

Of the methods of study.—The studies necessary for the young sculptor, towards the attainment of his art, are so similar to those which form the painter (with the obvious exceptions arising from the difference of materials employed in the two arts), that very little remains here to be enlarged on, under the head of studies. The principal acquisitions to which the student must direct his endeavours are, a knowledge of composition, form (including anatomy), and expression; to which, as in painting, must be added the difficult study of grace. These have been already treated of, under the articles painting, design or drawing, and expression. See DRAWING, EXPRESSION, and PAINTING.

The method of study most recommended to young sculptors is, to begin with copying, and end with rivalling, the forms of the Greek statues.

——— "Vos exemplaria Græca
Nocturnâ versate manu, versate diurnâ;"

says Du Fresnoy: nor can it be questioned that the sculptors are, generally speaking, the safest guides to the study of nature. But it should not pass unnoticed, that although the forms of the Greek sculpture are, in general, not only more beautiful, but more appropriately so than any other; yet in some instances they have been surpassed by modern sculptors, as in the forms of infants by Fiamingo.

The method of execution in the Greek statues and other works of sculpture, seems to have been extremely different from that which is generally in use among modern artists. In the ancient statues, we frequently find striking proofs of the freedom and boldness that accompanied each stroke of the chisel, and which resulted from the artist's being perfectly sure of the accuracy of the method which he pursued. Even in the most minute parts of the figure, no indication of timorousness or diffidence appears: nothing that can induce us to believe, that the artist feared he might have occasion to correct his strokes. It is difficult to find, even in the second-rate productions of the Grecian artists, any mark of a false stroke or a random touch. This firmness and precision of the Grecian chisel were certainly derived from a more determined and perfect set of rules, than those of which we are masters.

Besides studying, therefore, in the productions of the Grecian masters, their choice and expression of select nature, whether beautiful, sublime, or graceful, together with that sedate grandeur and simplicity which pervade all their works, the artist will do well to investigate the manual and mechanical part of their operations, as this may lead to the perception of their mode of progress.

As soon as the artist has rendered himself familiarly acquainted with the beauties of the Grecian statues, and formed his taste on the admirable models they exhibit, he may then proceed with advantage and assurance to the imitation of nature. The ideas he has already formed of the perfection of nature, by observing her dispersed beauties combined and collected in the compositions of the ancient artists will enable him to acquire with facility, and to employ with advantage, the detached and partial ideas of beauty which will be exhibited to his view in a survey of nature, in her actual state. When he discovers these partial beauties, he will be capable of combining them with those perfect forms of beauty, with which he is already acquainted. In a word, by having always present to his mind the noble models already mentioned, he will form an accurate judgment of the powers of his art, and will draw rules from his own mind.

There are, however, two ways of imitating nature. In the one, a single object occupies the artist, who endeavours to represent it with precision and truth; in the other, certain lines and features are taken from a variety of objects, and combined and blended into one regular whole. All kinds of copies belong to the first kind of imitation; and productions of this sort must necessarily be executed in a confined and servile manner, with high finishing, and little or no invention. But the second kind of imitation leads directly to the investigation and discovery of true beauty, of that beauty whose perfect idea is only to be found within the mind.

Of the different modes of process in sculpture.—Works of sculpture are performed, either by hollowing or excavating, as in metals, agates, and other precious stones, and in marbles of every description; or by working in relief, as in bas-reliefs in the materials just mentioned, or in statues in metal, clay, wood, wax, marble, or stone.

The excavation of precious stones forms a particular branch of art called intaglio, which, together with the working them in relievo, when the term camayeu is applied to them, belongs to the art of seal-engraving. See ENGRAVING.

The excavation of metals constitutes the art of engraving, in its various branches, on metal of any kind; and its relief comprises enchasing, casting in bronze, &c.

The process of hollowing hard stone or marble will need no particular description; especially as it is now wholly in disuse, except for the forming of letters in monumental or other inscriptions.

In working in relief the process is necessarily different, according to the materials in which the work is performed.

As not only the beginning of sculpture was in clay, for the purpose of forming statues, but as models are still made in clay or wax, for every work undertaken by the sculptor; we shall first consider the method of modelling figures in clay or wax.

Few tools are necessary for modelling in clay. The clay being placed on a stand or sculptor's easel, the artist begins the work with his hands, and puts the whole into form by the same means. The most expert practitioners of this art seldom use any other tool than their fingers, except in such small or sharp parts of their work as the fingers cannot reach. For these occasions, they are provided with three or four small tools of wood, about seven or eight inches in length, which are rounded at one end, and at the other flat and shaped into a sort of claws. These tools are called by the French ebauchoirs. In some of these the claws are smooth, for the purpose of smoothing the surface of the model; and in others are made with teeth, to rake or scratch the clay, which is the first process of the tool on the work, and in which state many parts of the model are frequently left by artists, to give an appearance of freedom and skill to their work.

If clay could be made to preserve its original moisture, it would undoubtedly be the fittest substance for the models of the sculptor; but when it is placed either in the fire, or left to dry imperceptibly in the air, its solid parts grow more compact, and the work shrinks, or loses a part of its dimensions. This diminution in size would be of no consequence, if it affected the whole work equally, so as to preserve its proportions. But this is not always the case: for the smaller parts of the figure drying sooner than the larger; and thus losing more of their dimensions in the same space of time, than the latter do; the symmetry and proportions of the work inevitably suffer.

This inconvenience, however, is obviated by forming the model first in clay, and moulding it in plaister of Paris before it begins to dry, and the taking a plaister cast from that mould, and the repairing it carefully from the original work; by which means you have the exact counterpart of the model in its most perfect state; and you have, besides, your clay at liberty for any other work.

In order to model in wax, prepare the wax in the following manner: to a pound of wax add half a pound of scammony (some mix turpentine also), and melt the whole together with oil of olives; putting more or less oil as you would have

your modelling wax harder or softer. Vermilion is sometimes mixed with this composition, to give it a reddish colour, in imitation of flesh.

In modelling in wax, the artist sometimes uses his fingers, and sometimes tools of the same sort as those described for modelling in clay. It is at first more difficult to model in wax than in clay, but practice will render it familiar and easy.

Of the use of the model.—Whatever considerable work is undertaken by the sculptor, whether bas-relief, or statue, &c. it is always requisite to form a previous model, of the same size as the intended work; and the model being perfected, according to the method before described, whether it is in clay, or in wax, or a cast in plaister of Paris, becomes the rule, whereby the artist guides himself in the conduct of his work, and the standard from which he takes all its measurements. In order to regulate himself more correctly by it, he puts over the head of the model an immoveable circle, divided into degrees, with a moveable rule fastened in the centre of the circle, and likewise divided into parts. From the extremity of the rule hangs a line with a lead, which directs him in taking all the points, which are to be transferred from the model to the marble; and from the top of the marble is hung also a line, tallying with that which is hung from the model; by the correspondence of which two lines, the points are ascertained in the marble.

Many eminent sculptors prefer measurements taken by the compasses to the method just described; for this reason, that if the model is moved but ever so little from its level, the points are no longer the same.

This method, however, offers the best means, by which mechanical precision may be attained; but it is manifest, that enough yet remains to exercise and display the genius and skill of the artist. For, first, as it is impossible, by the means of a straight line, to determine with precision the procedure of a curve, the artist derives from this method no certain rule to guide him, as often as the line which he is to describe deviates from the direction of the plumb line. It is also evident, that this method affords no certain rule to determine exactly the proportion, which the various parts of the figure ought to bear to each other considered in their mutual relation and connections. This defect, indeed, may be partly supplied by intersecting the plumb-lines by horizontal ones; but even this resource has its inconveniences; since the squares formed by transversal lines that are at a distance from the figure (though they are exactly equal), yet represent the parts of the figure as greater or smaller, according as they are more or less removed from our point of view.

Of sculpture in wood.—A sculptor in wood should first take care to choose wood of the best quality, and the most proper for the work which he intends to execute. If he undertakes a large work, requiring strength and solidity, he ought to choose the hardest wood, and that which keeps best, as oak and chesnut; but for works of moderate size, pear or apple-tree serve very well. As even these latter woods are still of considerable hardness, if the work consists only of delicate ornaments, the artist will find it preferable to take some more tender wood, provided it is at the same time firm and close; as, for instance, the Indian tree, which is excellent for this purpose, as the chisel cuts it more neatly and easily than any other wood.

The ancients made statues out of almost every different kind of wood. At Sicyon was a statue of Apollo made of box; the statue of Diana at Ephesus was of cedar. As these two sorts of wood are extremely hard and undecaying; and as cedar, in particular, is of such a nature, that, according to Pliny, it ought never to come to an end; the ancients preferred them for the images of their divinities.

In the temple built on mount Cyllene in honour of Mercury, Pausanias relates, that there was a statue of that god made of citron-wood, eight feet in height. This wood was also much esteemed.

The cypress likewise, being a wood not apt to spoil, nor to be damaged by worms, was also used for statues; as were the palm-tree, olive, and ebony, of which latter, according to Pliny's account, there was another statue of Diana at Ephesus.

Several other kinds of wood were equally employed for this purpose, even the vine, of which the same author says there were statues of Jupiter, Juno, and Diana.

Felibien speaks of a French artist at Florence, of the name of Janni, who executed several statues in wood, in a style of finishing equal to marble, and particularly one of St. Rocque, which Vasari considered as a marvellous production,

The beauty of sculpture in wood consists in the tender manner of cutting the wood, free from all appearance of hardness or dryness.

For any work of large dimensions, even though it consists of a single figure, it is better to join together several smaller pieces of wood than to make the whole of a single large piece; which is more able to warp and crack, on account of its not being always dry at heart, although it appears perfectly dry on the outside.

No wood can be properly fit for works of this kind that has not been cut at least ten years before.

The tools used for sculpture in wood are the same as those of the joiner or cabinet-maker.

Of sculpture in stone and marble.—For sculpture in marble and other stone, the artist must make use of tools made of good steel, well tempered, and of strength proportioned to the hardness of the material.

The first thing to be done is, to saw out from a larger block of marble, a block proportioned to the size of the work which is undertaken. After this, the sculptor shapes the gross masses of the forms he designs to represent, by knocking off the superfluous parts of marble with a strong mallet or beel, and a strong steel tool called a point.

When the block is thus hewn out agreeably to the measures previously taken for the performance of the work, the sculptor brings it nearer to the intended form by means of a finer point; and sometimes of a tool called a dog's tooth, having two points, but less sharp than the single one.

After this he uses the gradine, which is a flat cutting tool, with three teeth, but is not so strong as the point.

Having advanced his work with the gradine, he uses the chisel to take off the ridges left by the former tools; and by the dexterous and delicate use of this instrument, he gives softness and tenderness to the figure, till at length, by taking a rasp, which is a sort of file, he brings his work into a proper state for being polished.

Rasps are of several kinds, some straight, some curved, and some harder or softer than others.

When the sculptor has thus far finished his

work with the best tools he can procure, wherever certain parts or particular works require polishing, he uses pumice-stone to make all the parts smooth and even. He then goes over them with tripoli, and when he would give a still higher gloss, he rubs them with leather and straw-ashes.

Besides the tools already mentioned, sculptors use also the pick, which is a small hammer pointed at one end, and at the other formed with teeth made of good steel and squared, to render them the stronger. This serves to break the marble, and is used in all places where the two hands cannot be employed to manage the mallet and chisel.

The bouchard, which is a piece of iron, well steeled at the bottom, and formed into several strong and short points like a diamond, is used for making a hole of equal dimensions, which cannot be done with cutting tools. The bouchard is driven with the mallet or beetle, and its points bruise the marble and reduce it to powder. Water is thrown into the hole from time to time, in proportion to the depth that is made, to bring out the dust of the marble, and to prevent the tool from heating, which would destroy its temper; for the free-stone dust on which tools are edged, is only moistened with water to prevent the iron from heating and taking off the temper of the tool by being rubbed dry; and the trepans are wetted for the same reason.

The sculptor uses the bouchard to bore or pierce such parts of his work as the chisel cannot reach without danger of spoiling or breaking them. In using it, he passes it through a piece of leather, which leather covers the hole made by the bouchard, and prevents the water from spirting up in his face.

The other tools necessary for sculpture on marble or stone, are the roundel, which is a sort of rounded chisel; the houguet, which is a chisel squared and pointed; and various compasses to take the requisite measures.

The process of sculpture in stone is the same as in marble, excepting that the material being less hard than marble, the tools used are not so strong, and some of them are of a different form, as the rasp, the hand-saw, the ripe, the straight chisel with three teeth, the roundel, and the grater.

If the work is executed in free-stone, tools are employed which are made on purpose, as the free-stone is apt to scale, and does not work like hard stone or marble.

Sculptors in stone have commonly a bowl in which they keep a powder composed of plaister of Paris, mixed with the same stone in which their work is executed. With this composition they fill up the small holes, and repair the defects which they meet with in the stone itself.

HISTORY OF SCULPTURE.

Ancient art.—Sculpture therefore may trace its pedigree from the infancy of the world, and contend for pre-eminence with the most remote antiquities which it has been employed to celebrate. Josephus, Cedrenus, and some other authors, make mention of some antediluvian sculptures in stone and brick erected at Joppa, which are imagined to have contained the system of sidereal and celestial sciences, and to have remained unhurt for some thousands of years after the universal cataclysm.

Concerning the art of sculpture immediately after the flood, it is scarcely to be questioned that it was transmitted by Noah to his descendants. About three hundred years after the deluge Mercurius Trismegistus reports of himself, that he engraved his most abstruse mysteries on stone, reforming all that had been depraved by Cham. Some of these records were in letters, some in figures and enigmatical characters, probably not unlike to those contained in the stupendous obelisks erected by Misra, the first Egyptian Pharaoh, about four hundred years (according to Kircher) before Moses.

The first mention that is made of the art of sculpture in the writings of Moses, is in the book of Genesis, where we are informed that when Jacob, in obedience to the divine command, was returning to Canaan, his wife Rachel carried along with her the theraphim, or idols, of her father's house. These must certainly have been very small images, since Rachel found it so easy to conceal them from her father, notwithstanding his anxious search: but we are ignorant in what form they were made, or of what materials they were composed. The first persons mentioned in the Bible as artists, are Aholiab and Bezaleel, who formed the cherubim which covered the mercy-seat, and wrought the ornaments of the pectoral to be worn by the high priest.

As Chaldea, therefore, was the first peopled region of the earth after the flood, and as it appears from various accounts that the art of engraving upon bricks baked in the sun was there carried to a considerable degree of perfection at a very early period, it appears highly probable that the Chaldeans derived the rudiments of the art of sculpture immediately from their antediluvian ancestors.

The origin of idolatrous worship is generally thought to be derived from images first made to preserve the memory of the dead, and, in process of time, converted by the flatteries of great men into objects of adoration. This also affords presumptive evidence that the Chaldeans were the first who invented the art of hewing blocks of wood and stone into the figures of men and other animals; but the Chaldeans were unquestionably the first idolators, and their early progress in sculpture is confirmed by the united testimonies of Berosus, Alexander, Polyhistor, Apollodorus, and Pliny.

Phœnicia, in the immediate vicinity of Chaldea, must necessarily have very early acquired a knowledge of sculpture. The Phœnicians possessed both a character and situation highly favourable to the cultivation of this art. They beheld the most beautiful models in their own persons, and their industrious character qualified them to attain perfection in every art for which they had a taste. But as their situation raised a spirit of commerce, it is at all times questionable whether commerce induced them to cultivate the arts. Their temples shone with statues and columns of gold, and a profusion of emeralds were every where scattered; but the beauties of art do not consist in finery or ostentation of wealth. The greatest works of the Phœnicians have been unfortunately destroyed; many Carthaginian models indeed are still preserved, ten of which were deposited in the cabinet of the grand duke of Florence. But though the Carthaginians were a colony of Phœnicians, we should probably

deduce from their works a very unfair estimate of the merit of their ancestors.

The Persians represented in their bas-reliefs many symbolical expressions of the powers of the Divinity, as well as of their religious ceremonies or heroic achievements. The bas-reliefs on the palace of Persepolis and the tombs of the Persian sovereigns are arranged in horizontal and perpendicular lines, answering the double purpose of description and architectural decoration. The style of drawing in these bas-reliefs resembles that of later hieroglyphics, except in the dresses of the figures, which are different from those either of the Egyptians or Hindoos. The Persians are represented with long beards and ringlets, caps, full tunics, with regular folds and large sleeves. The Medes, in the same ruins of Persepolis, have close tunics. The drapery in these bas-reliefs is superior to that of the Egyptians, as bearing a greater resemblance to nature.

In Hindustan and Egypt the art of sculpture has been exercised in a similar manner in the shaping or adorning large rude masses of the hardest materials, and the works of these two nations may not improperly be considered together.

In India bas-reliefs have been found in great numbers in the caves of Ellora and Elephantis: the subjects are religious. The drawing of the figures bears a strong resemblance to the Egyptian style, but they are less correct in their forms, the heads being generally very large, and the limbs disproportioned to the bodies. It may be questioned, from the greater simplicity of execution, whether the Egyptian hieroglyphics are not also more ancient than the Hindoo; the ground in the former being level with the highest relievo, and in the latter cut down to the lowest outline of the figure.

The character and style of design among the Egyptians have been more fully noticed by writers, because the first progress of the art among that people is conceived to elucidate that of most other ancient nations.

In the Egyptian idols, composed of parts of different animals, each part appears to have been distinctively studied from nature. In the human figure, the body and limbs were represented by general forms: the face, as being the most interesting part, was more minutely expressed. The form of a face was a rounded egg; the lines of the eye-brows and lids were simple curves, inclining upwards from the nose; and the bottom of the nose and the line of the mouth were also in a similar direction. The eyes were full, nearly on a level with the forehead and cheeks, and the lines of the eye-brows, lids, and borders of the lips marked with precision. The chin appears small and bony, the neck round, the shoulders high and broad, and the muscles of the breast are almost the only ones that are distinguished in the whole body. The loins are narrow, the limbs in general round and slender, the joints slightly indicated, the hands and feet flattish, and the fingers and toes rounded without any appearance of joints, and nearly of the same length. This, with the allowance of some national peculiarities of form, may serve for the description of early sculpture in general among the ancients.

The quadrupeds on Egyptian monuments are represented in profile, and in the simplest attitudes. The Egyptians excelled more in these than in the human figure; but the anatomy of these also is insufficient and incorrect. The lion and the sphinx are particularly to be noticed in their works.

The larger Egyptian hieroglyphics (whether engraven on the surface of their architecture, or on the forms of animals), in which the figure is cut or sunk, in such a manner that the surface of the ground is level with its highest projection, may be considered as a species of bas-relief, more simple, and consequently more ancient, than any other. The greater part of their temples, and other public edifices, were covered with hieroglyphics, or sacred figure-writing, in this kind of bas-relief; the largest of which formed regular ornaments in the friezes, centres over the doors, and other architectural parts.

Besides the hieroglyphics, the Egyptians worked in bas-relief, with the ground levelled to the lowest part of the figures. In these they represented the great actions of their heroes, as may be seen in the palace of Karnac, engraved by Denon, and in those described in the Bird's Well, of which there is a specimen in the hall of the British Museum.

Winckelmann thought he discovered two different styles of Egyptian sculpture, which prevailed at different periods. The first of these ends with the conquest of Egypt by Cambyses. The second begins at that time, and extends beyond the reign of Alexander the Great. In the first style, the lines are straight, or projecting very little; the position is stiff and unnatural. In sitting figures the legs are parallel, the feet squeezed together, and the arms fixed to the sides; but in the figures of women, the left arm is folded across the breast. The forms of the head and body are such as have been already described. The statues of men are naked, excepting only that they have a short apron, and a few folds of drapery surrounding their waist. The vestments of women are only distinguishable by the border which rises a little above the surface of the statue. In this age it is evident the Egyptians knew little of drapery.

Of the second style of sculpture practised among the Egyptians, Winckelmann found specimens in the two figures of basaltes in the capitol, and in another figure in the Villa Albani, the head of which has been restored. The two first of these, he remarks, bear visible traces of the former style, which appear especially in the form of the mouth and shortness of the chin. The hands possess more elegance; and the feet are placed at a greater distance from one another than was customary in more ancient times. In the first and third figures the arms hang down close to the sides, In the second they hang more freely. Winckelmann suspects that these three statues were made after the conquest of Egypt by the Greeks. They are clothed with a tunic, a robe, and a mantle. The tunic, which is pleated in numerous folds, descends from the neck to the ground. The robe in the first and third statues appears to be every where close to the body, and is only perceptible by some little folds. It is tied under the breast, and covered by the mantle, the two buttons of which are placed under the epaulet.

The Antinous of the capitol is composed of two pieces, which are joined under the haunches; but as all the Egyptian statues which now remain have been hewn out of one block, we must believe that Diodorus, in saying the stone was divided, and each half finished by a separate artisan, spoke only of a Colossus. The same author informs us that the Egyptians divided the human body into 24½ parts; but it is to be regretted that he has not given a more minute detail of that division.

SCULPTURE.

The Egyptian statues were not only formed by the chisel; they were also polished with great care. Even those on the summit of an obelisk, which could only be viewed at a distance, were finished with as much labour as if they had admitted a close inspection. As they are generally executed in granite or basaltes, stones of a very hard texture, it is impossible not to admire the indefatigable patience of the artists.

The eyes were often of different materials from the rest of the statue; sometimes they were composed of precious stones or metal. We are assured that the valuable diamond of the empress of Russia, the largest and most beautiful hitherto known, formed one of the eyes of the famous statue of Scheringham in the temple of Brama.

After the Egyptian works of art, the most ancient are those of the Etrurians or ancient Tuscans, who, in the opinion of the same learned writer Winckelmann, made advances in sculpture at an earlier period than the Greeks. The art is said to have been introduced among them before the siege of Troy, by Dedalus; who, in order to escape the resentment of Minos, king of Crete, took refuge in Sicily, from whence he passed into Italy, where he left many monuments of his art. Pausanias and Diodorus Siculus inform us, that some works ascribed to him were to be seen when they wrote, and that these possessed that character of majesty by which the Etrurian sculpture was afterwards distinguished.

A character strongly marked forms the chief feature of those productions of Etruria which have descended to us. Their style was indeed harsh and overcharged; for it is not to be supposed that a people of such rude manners as the Etrurians could communicate to their works that refinement and beauty which the elegance of Grecian manners inspired. On the other hand, there are many of the Tuscan statues which bear so close a resemblance to those of Greece, that antiquarians have thought it probable that they were conveyed from that country or Magna Grecia into Etruria about the time of the Roman conquest, when Italy was adorned with the spoils of Greece.

Among the monuments of Etrurian art, two different styles have also been observed. In the first the lines are straight, the attitude stiff, and the shape of the head without beauty. The general form of the figure is likewise too slender: the head is oval, the chin peaked, the eyes flat, and looking obliquely.

All these are evidently the defects of an art in a state of infancy, and some of them are equally conspicuous in the early statues of all nations. The style of the Etrurian sculpture is so similar to that of the Egyptians, that one is almost induced to suppose that there had once been a communication between these two nations; but the introduction of this style by Dedalus is generally credited.

Winckelmann supposes that the second epoch of the art commenced in Etruria about the time at which it had reached its greatest perfection in Greece, in the age of Phidias; but this conjecture is not supported by any proofs. To describe the second style of sculpture among the Etrurians is almost the same as to describe the style of the modern restorers of the art in Tuscany. The joints are strongly marked, the muscles raised, the bones distinguishable, but the whole appearance is harsh, particularly in the representation of ordinary life. The statues of the gods are designed with more delicacy. In forming them the artists were anxious to show that they could exercise their power without that violent distension of the muscles which they conceived necessary in the exertions of beings merely human; but in general their attitudes are unnatural, and the actions strained. If a statue, for instance, holds any thing with its fore fingers, the rest are stretched out in a stiff position.

Greece.—The earliest examples of Grecian sculpture remind us still more of the Egyptian, in the principles of design, than those of any other nation. The face of the human figure has the same kind of oval, the features are described by the same curves, the eye full, and the body and limbs represented nearly in the same general forms. The works of the early Greeks may, however, be justly said to be equal to the Egyptians in the proportions of their figures, and superior in the drawing of the body and limbs.

It is probable that sculpture preceded the use of letters in Greece, as in other nations; but the small bronze figures with inscriptions on them in Cadmean letters are such weak and barbarous resemblances of the human form, that it is needless to trace its origin in any more remote period.

The Grecians began very early to study the proportions of the human form. Vitruvius informs us, that "as the height of the human figure was six times the length of the foot, that was made the rule of proportion for the Doric column." Their knowledge, therefore, in this part of art, was antecedent to their architectural proportions.

Whether Greece received the principles of the arts from Egypt and Phœnicia, or, as they asserted, were the original inventors of them, it is certain that the native genius of the Grecians, combined with other peculiarly favourable circumstances, very soon raised sculpture from a state of barbarism.

In the earliest æra of sculpture in Greece, schools of design were established in the island of Ægina, at Corinth, and at Sicyon. This last city was styled the mother of the arts, as Diapænus and Scillides, and their disciples also, had flourished there; and after seven generations, Aristocles, the brother of Canacus, likewise a sculptor of eminence, presided over the same establishment with undiminished fame. The school of Ægina traced its origin to Dedalus, of fabulous renown: and his cotemporary Smilis made two statues of Juno; one for her temple at Samos, and the other for that at Argos.

From these auspicious dawnings of the art of sculpture three distinct schools arose, one of which was peculiar to Ionia; the others were in Greece, at Athens, and at Sicyon, each of them shining with nearly equal splendour for several ages.

At the head of the first Grecian artists stands Myron, whose statues in bronze attracted universal admiration. A Discobulus made by Myron, is particularly noticed by Quinctilian.

Phidias, whose name is better known in the present day than that of any other sculptor, was the disciple of Eladas and Ageladas, the probable cotemporaries of Myron, and who flourished in the sixteenth olympiad. We collect from Quinctilian, that he excelled in imparting a celestial dignity to his figures of the deities, two of which are celebrated in this respect, the Minerva at Athens, and Jupiter Olympius at Elis. Many of his most beautiful works were in ivory, frequently less than the natural size. He cast likewise in bronze.

In the same age lived Polycletus, whose works were distinguished by exquisite grace and most

correct finishing: the latter quality was the effect of his singular diligence. To the human figure he is said to have given more than human beauty, but he failed in expressing the majestic character of the gods.

The works of Egesias were of a sublime style, but hard manner.

Of the school of Phidias, the most distinguished sculptors were Alcamenes of Athens, and Agoracritus of the island of Paros. Their rival skill was exerted in finishing a statue of Venus, and the palm was adjudged by the Athenians to their own citizen.

Polycletus of Sicyon was the competitor with Phidias in an undertaking of more grandeur and consequence than his general works. He was employed by the inhabitants of Argos to make a colossal statue of Juno, composed of gold and ivory, in order to emulate, rather than to imitate, the Olympic Jupiter of Phidias. Two figures in bronze by Polycletus representing the canephoræ or nymphs bearing in baskets the symbols of Ceres to a sacrifice, were taken from the Thespians by Verres, and brought to Rome. They were esteemed beyond any bronze figures existing at that time. Such was the skill of this eminent master, that he completed so perfect a human figure that it served as a model to his successors, and was considered by Lysippus as the acme of his art.

While Phidias in gold and ivory, and Polycletus in bronze, engrossed to themselves every excellence, Scopas acquired a scarcely inferior celebrity for his statues in marble. The groupe of Niobe and her children is attributed by Pliny to Scopas or Praxiteles, he does not decide which.

The last sculptor (of whose works we have any knowledge) coeval with Phidias, was Ctesilaus, who, jointly with him and Polycletus, finished one of the three Amazons designed to decorate the temple of Diana at Ephesus, and the statue of Pericles, commended by Pliny, who allows to Ctesilaus the felicity of giving to his heroes a still more noble air than they possessed.

The names of Policles, Cephisodorus, Leochares, and Hippodotus, are preserved from oblivion by Pliny, but none of their works remain. Leochares was one of the four artists employed in adorning the mausoleum built by the celebrated Artemisia, queen of Caria, to the memory of her husband.

Menestratus, Socrates, Philiscus, Lysias, Mirmecides, and many others, are also spoken of with praise by various writers; but we have unfortunately no other remaining testimonies of their merits.

Of the first style of the Grecian sculptors, so remarkable for simplicity and grandeur, the æra was circumscribed to the limits of fifty years, during which period the art had arrived at its meridian of sublimity. The succeeding age introduces Praxiteles, who may be called the father of the second manner, and whose works were discriminated by their flowing outline and delicate finishing. The elevation of Thebes by Epaminondas above the other states of Greece produced a comple change in her whole system; but as soon as the Athenians recovered their former splendour, the arts, which had ever accompanied the vicissitudes of her fortunes, revived with unabated splendour. The works of Praxiteles are celebrated by historians and poets. His Venus of Gnidus in marble, attracted then no less admiration than the Medicean Venus has done in the modern world; and his Apollo in bronze, called (from the lizard in the trunk of the tree against which he leans) Sauroctonos, is still among the most admired productions of sculpture.

Not long after Praxiteles had signalized himself in statuary, and particularly in bronze, Lysippus appeared, whose great merit consisted in following nature more scrupulously than any of his immediate predecessors. If, as Pliny reports, his works were so numerous as to amount to not less than fifteen hundred, we have the more cause to regret that they were all of bronze, and are irretrievably destroyed. He flourished under the reign of Alexander.

To Agesander, Polydorus, and Athenodorus, is ascribed (by Pliny) the celebrated group of the Laocoon and his sons, and conjecture has been frequently busied in endeavouring to discriminate the particular portion of each artist; but conjecture only has hitherto been produced. Abbé Winckelmann conjectures that Agesander was the father of the other two artists, and that he himself finished the statue of Laocoon, leaving the children to be wrought by his sons.—"Credat Judæus apella." No authentic document remains by which the time in which these artists flourished can be ascertained.

Neither do we know the precise date of Apollonius and Tauriscus, the authors of a no less celebrated group representing Dirce tied to the horns of a bull (in order to be precipitated into the sea) by Zethus and Amphion, the sons of Antiopa. This work is generally supposed to have been cotemporary with the rival group of Laocoon. In an inscription on it, now obliterated, was traced the name of another artist, Menecrates. This vast mass of sculpture is said to have been formed out of a single block, in the island of Rhodes. It has suffered greatly in the course of time.

Greece, after the death of Alexander the Great, lapsing into a state of dependance little better than slavery, the arts were for a time wholly neglected; and might have been nearly annihilated, had they not found refuge in Asia, under the patronage of the Seleucidæ. Men of talents also in every profession sought at that time in Egypt the encouragement afforded them by Ptolemy Soter, who exhibited a munificence worthy of Alexander, his predecessor in that kingdom. But when the Roman consul, Quintus Flaminius, proclaimed, at Corinth, universal liberty to Greece (about 194 years before Christ), the public tranquillity, consequent on that event, renewed the spirit of the arts, and introduced another of their most memorable æras.

Callistratus, Athenæus, and Policles, were immediately at this period the most renowned masters of sculpture. Policles distinguished himself by the statue of the Hermaphrodite, so long admired in the Borghese Villa at Rome.

To Apollonius the Athenian, at the same period, is attributed the wonderful Torso of the Hercules, preferred by the judgment of Michael Angelo beyond the most perfect statues of Rome.

Causes of the excellence of sculpture among the Greeks.

The great superiority of the Greeks in the art of sculpture may be ascribed to a variety of causes. Their love of beauty was so great, that the Lacedemonian women kept in their chambers the statues of Nereus, of Narcissus, of Hyacinthus, and of Castor and Pollux; hoping that by often contemplating them they might have beautiful children.

The noble and virtuous freedom of the Grecian

manners likewise contributed in a more peculiar degree to the cultivation of the fine arts. There were no laws, as among the Egyptians, to check their progress. The artist had the best opportunities to study them in the public places, where the youth, who needed no other veil than chastity and purity of manners, performed their various exercises quite naked.

The strongest motives were also held forth for the cultivation of sculpture, for a statue was the highest honour which public merit could attain. It was an honour ambitiously sought, and granted only to those who had distinguished themselves in the eyes of their fellow-citizens. As statues were often raised to those who excelled in the public exercises, the most eminent men of Greece, in their youth, sought renown in the gymnasia. Here Chrysippus and Cleanthes distinguished themselves before they were known as philosophers. Plato appeared as a wrestler both at the Isthmian and Pythian games; and Pythagoras carried off the prize at Elis. The number of statues erected on different occasions was immense; of course, the number of artists must have been great, their emulation ardent, and their progress rapid. Moreover, at these public games, the artists could not fail of seeing the most excellent models; for those who surpassed in running, boxing, and wrestling, must not only, in general, have been well formed, but would exhibit different kinds of beauty.

The high estimation in which sculptors were held was also very favourable to their art. An artist could be a legislator, a commander of armies, and might hope to have his statue placed at the side of those of Miltiades and Themistocles, or those of the gods themselves. The productions of art were estimated and rewarded by the general assembly of Greece; and the sculptor who had executed his work with ability was confident of obtaining immortality.

Character of Grecian sculpture.

Winckelmann has assigned four different styles to this art among the Greeks. The ancient style, which continued until the time of Phidias; the grand style, formed by that celebrated statuary; the beautiful, introduced by Praxiteles, Apelles, and Lysippus; and the imitative style, practised by those artists who copied the works of the ancient masters.

The most authentic monuments of the ancient style have been already described. The statues formed in this style were neither distinguished by beauty of shape, nor by proportion, but bore a close resemblance to those of the Egyptians and Etrurians. The eyes were long and flat; the section of the mouth not horizontal; the chin was pointed; the curls of the hair were ranged in little rings, and it was impossible by inspecting the head to distinguish the sex.

The character of the ancient style was energetic, but harsh; it was animated, but without gracefulness; and the violence of the expression deprived the whole figure of beauty.

The grand style was brought to perfection by Phidias, Polycletus, Scopas, Alcamanes, Myron, and other illustrious artists. It is probable, from some passages of ancient writers, that in this style were preserved some characters of the ancient manner, such as the straight lines, the squares, and angles. The ancient masters, such as Polycletus, being the legislators of proportion, says Winckelmann, and of consequence thinking they had a right to distribute the measures and dimensions of the parts of the human body, have undoubtedly sacrificed some degree of the form of beauty to a grandeur which is harsh, in comparison of the flowing lines and graceful forms of their successors. The most considerable monuments of the grand style, are the statues of Niobe and her daughters; and a figure of Pallas, to be seen in Villa Albani: which, however, must not be confounded with another statue, modelled according to the first style, and also found in the same place; the head of which possesses all the characters of dignified beauty, at the same time exhibiting the rigidness of the ancient style. The figures of Niobe and her daughters have not, in the opinion of Winckelmann, that austerity of appearance which marks the age of the last-mentioned statue of Pallas. They are particularly characterised by grandness and simplicity.

The third style was the graceful or beautiful. Lysippus was, perhaps, the artist who introduced this style. Being more conversant than his predecessors with the flowing and beautiful lines of nature, he avoided the square forms which the masters of the second style had too frequently admitted. He was of opinion that the art ought rather to please than to astonish, and that the aim of the artist should be to raise admiration by giving delight. The artists who cultivated this style did not, however, neglect to study the sublime works of their predecessors. They knew that grace is consistent with the most dignified beauty; and that while it possesses charms which must ever please, those charms are enhanced by dignity. Grace is inspired into all the movements and attitudes of their statues. It appears in the delicate turn of the hair, and even in the adjusting of the drapery.

The last, or imitative style, is of an inferior degree of excellence to that which has just been mentioned. The great reputation of Praxiteles and Apelles raised an ardent emulation in their successors, who, despairing to surpass such illustrious masters, were satisfied with imitating their works.

Every species of beauty of form appears to have been well known to the ancients; and great as the ravages of time have been amongst the works of art, specimens are still preserved in which can be distinguished dignified beauty, attractive beauty, and a beauty peculiar to tender age. A specimen of dignified beauty may be seen in the statue of one of the Muses in the palace Barberini at Rome, and in the garden of the pope. On the Quirinal is a statue of another Muse, which affords a fine instance of attractive beauty. Winckelmann says that the most excellent model of infant beauty which antiquity has transmitted to us is a satyr of a year old, which is preserved, though a little mutilated, in the Villa Albani.

Nor were the sculptors who represented with such success the most perfect beauty of the human form regardless of the drapery of their statues. They clothed their figures in the most proper stuff, which they wrought into that shape which was best calculated to give effect to their design.

The vestments of women in Greece generally consisted of linen cloth, or some other light stuff, and in latter times of silk, and sometimes of woollen cloth. They had also garments embroidered with gold. In the works of sculpture, as well as in those of painting, one may distinguish the linen by its transparency and small folds. The other light stuffs which were worn by the wo-

men were generally of cotton, sometimes striped, and sometimes embellished with a profusion of flowers. Silk was also employed; but whether it was known in Greece before the time of the Roman emperors cannot easily be determined.

The vestments of the Greeks, which deserve particular attention, are the tunic, the robe, and the mantle.

The tunic was that part of the dress which was next to the body. It may be seen in the Flora Farnese, and in the statues of the Amazons in the capitol. The youngest of the daughters of Niobe, who throws herself into her mother's arms, is clothed only with a tunic. It was of linen, or some other light stuff, without sleeves, fixed to the shoulders by a button, so as to cover the whole breast. None but the tunics of the goddess Ceres, and of comedians, have long straight sleeves.

The robes of women commonly consisted of two long pieces of woollen cloth, without any particular form, attached to the shoulders by a great many buttons, and sometimes by a clasp. They had straight sleeves, which came down to the wrists. The young girls, as well as the women, fastened their robe to their side by a cincture, fastened on the side in a knot, as it is still done in many parts of Greece; a knot of ribbons sometimes resembling a rose in shape, which has been particularly remarked in the two beautiful daughters of Niobe. In the younger of these, the cincture is seen passing over the shoulders and the back. Venus has two cinctures, the one passing over the shoulder, and the other surrounding the waist. The latter is the cestus so celebrated by the poets.

The mantle was called peplon by the Greeks, which signifies properly the mantle of Pallas. The name was afterwards applied to the mantles of the other gods, as well as to those of men. This part of the dress was not square, as some have imagined, but of a roundish form. The ancients, indeed, speak in general of square mantles, but they received this shape from four tassels which were affixed to them: two of these were visible, and two were concealed under the mantle. The mantle was brought under the right arm, and over the left shoulder: sometimes it was attached to the shoulder by two buttons, as may be seen in the beautiful statue of Leucothoe at Villa Albani.

With respect to the head, women generally wore no covering but their hair; when they wished to cover their head, they used the corner of their mantle. Sometimes we meet with veils of a fine transparent texture. Old women wore a kind of bonnet upon their head, an example of which may be seen in a statue in the capitol, called the Præsica; but Winckelmann thinks it is a statue of Hecuba.

The covering of the feet consisted of shoes or sandals. The sandals were generally an inch thick, and composed of more than one sole of cork. Those of Pallas in Villa Albani have two soles, and other statues had no less than five.

But in no part of art are the Grecian sculptors more eminently excellent than in the general characteristic expression which they gave to their figures.

The most elevated species of tranquillity and repose was studied in their figures of the gods. The father of the gods, and even inferior divinities, are represented without emotion or representment. But Jupiter is not always exhibited in this tranquil state. In a bas-relief belonging to the marquis Rondini, he appears seated with a melancholy aspect. The Apollo, once called of the Belvedere, in the Vatican, represents the god in the act of discharging from his bow the mortal shaft against the serpent Python.

To express the action of a hero, the Grecian sculptors delineated the countenance of a noble virtuous character repressing his groans, and allowing no expression of pain to appear.

Philoctetes is introduced by the poets shedding tears, uttering complaints, and rending the air with his groans and cries; but the artist exhibits him silent, and bearing his pains with dignity; in the same manner as the Ajax of the celebrated painter Timomachus was not drawn in the act of destroying the sheep which he took for the Grecian chiefs, but in the moments of reflection which succeeded that frenzy.

Illustrious men, and those invested with offices of dignity, are represented with a noble assurance and firm aspect. The statues of the Roman emperors (executed by Greek artists) resemble those of heroes, and are far removed from every species of flattery, in the gesture, in the attitude, and action. They never appear with haughty looks, or with the splendour of royalty. None but captives are ever represented as offering any thing to them with bended knee.

The Greek works of ivory and silver were not always of a small size. The colossal Minerva of Phidias, which was composed of these materials, was 26 cubits high. It is indeed scarcely possible to believe that statues of such a size could entirely consist of gold and ivory. The quantity of ivory necessary to a colossal statue is beyond conception. M. de Pauw calculates, that the statue of Jupiter Olympus, which was 54 feet high, would consume the teeth of 300 elephants.

The Greeks generally hewed their marble statues out of one block, though they afterwards worked the heads separately, and sometimes the arms. The heads of the famous group of Niobe and her daughters appear to have been adapted to their bodies after being separately finished. It is proved by a large figure representing a river, which is preserved in Villa Albani, that the ancients first hewed their statues roughly, before they attempted to finish any part. When the statue had received its perfect figure, they next proceeded to polish it with pumice-stone, and again carefully retouched every part with the chisel.

The ancients, when they employed porphyry, usually made the head and extremities of marble. It is true, that at Venice there are four figures entirely composed of porphyry; but these are the productions of the Greeks of the middle age. They also made statues of basaltes and alabaster.

The ancients, as well as the moderns, made works in plaister; but no specimens remain, except some figures in bas-relief, of which the most beautiful were found at Baiæ, near Naples.

We have been thus minute in our account of the Grecian sculpture, because it is the opinion of able critics, that modern artists have been more or less eminent, as they have studied with the greater or less attention the models left us by that ingenious people.

Rome.—After taking a view of these arts in Greece, we may direct our minds to the introduction of them at Rome, and to the liberal encouragement which men of talents experienced even from their haughty and rapacious conquerors.

Pasiteles, a name which has been confounded with Praxiteles, was a native of Calabria; and cast in silver a statue of Roscius, the celebrated actor, as an infant lying in a cradle, and entwined

by a serpent, a situation of danger from which his nurse is said to have preserved him. Nearly about the same time, Archesilaus and Evander were in great request at Rome. Archesilaus was patronized by the profuse and wealthy Lucullus; and both these artists had gained celebrity by their works in chalk, modelled probably from the finest antiques, as well as being specimens of their own invention. A Venus, made for Julius Cæsar, and the restoration of a head of Diana for a statue, the original work of Timotheus, the contemporary of Scopas, by the command of Augustus, are noticed by Pliny as their work, and ascertain their æra, and their fame. Horace alludes to the superior style of Evander in bas-reliefs.

Among the monuments of sculpture made at Rome, in these last days of her republic, and certainly by Grecian artists, are the two statues of the Thracian kings, as prisoners at a triumph, in grey marble. These were kings of the Sordisci, a rude people, who were defeated by M. Licinius Lucullus. Exasperated by their repeated perfidy, he commanded their hands to be cut off, a circumstance of cruelty represented in the marble, which now remains in the museum of the capitol.

The statue of Pompey (now in the hall of the Spada palace, but originally standing in the curia or basilica of Pompey), at the base of which Cæsar fell, affords a singular proof of a deviation from the known custom of the Romans, who represented their living heroes in armour. But the great triumvir is sculptured as a deified hero, naked, and of colossal proportions.

We must now consider the arts as transplanted to Rome, although still professed, almost exclusively, by Greek sculptors. Julius Cæsar, who, while in a private station, had made an extensive collection of intaglios, and small figures in ivory and bronze; and who, when dictator, dedicated them as a public benefaction in the temple of Venus Genitrix; may be said to have left the love of the arts as an inheritance to the Romans.

Augustus, after he assumed the imperial government, dispatched Memmius Regulus to collect from every city of Greece the statues yet remaining in them. His orders were so well observed, that the finest pieces of sculpture were brought to Rome, with a profusion by which his palaces were crowded; and many were distributed in his numerous villas. The Olympian Jupiter, of Phidias, composed of gold and ivory, was almost the only statue that escaped; the artists of Greece asserting, that from the state of its materials it would not bear removal.

Augustus encouraged also the prevailing mode of representing in statuary the most distinguished characters of the age, and placed many of their statues in public situations of eminence.

Succeeding emperors followed the example of Augustus. We are informed by Pausanias, that from the temple of Delphos only five statues were transported to Rome by Nero, who also employed Zenodorus to cast a colossal statue of him in bronze 110 feet high.

Nero, however, indulged the perverseness of his taste in gilding, and otherwise disfiguring, many of these exquisite works.

The triumphal arch built by Titus, and the frieze in the temple of Minerva, built by Domitian, give a very favourable idea of the arts under those emperors.

In the sculpture of triumphal bas-reliefs and trophies, the artists were particularly eminent. The architectural plans adopted by Trajan were of such magnitude, that men of every kind of talents were invited to signalize themselves under his munificent patronage. His bridge over the Danube, his triumphal arch at Ancona, his forum including the column which now bears his name, appear to have given employment to all the powers of human skill.

Under the auspices of Hadrian, the successor of Trajan, the arts maintained a progressive degree of excellence. He was eminently accomplished, not only as an admirer, but was himself an artist. Every province in Greece enjoyed his munificence; and the temple of Jupiter at Athens, which he restored, and that of Cyzicum, on the shores of Propontis, which he built, were stupendous monuments of imperial splendour. Having for eighteen years been engaged in visiting the most distant parts of the Roman empire, he resolved to construct his villa at Tivoli; in which, not only exact models of the most celebrated buildings he had seen should be erected, but that they should be furnished with originals, or the finest copies, of the most admirable statues. His correct judgment in all works of art contributed more to the absolute superiority of this collection than the mere power of expending unlimited treasures to procure it.

It was by Hadrian that the fashion of having portraits in statuary was so generally extended amongst the noble and opulent citizens of Rome. In his own villa at Tivoli were placed, by his command, the statues and busts not only of all his living, but of his deceased, friends. Of his favourite Antinous, in various characters, there are infinite repetitions. That most valued was found on the Esquiline hill, and was placed by Leo X. in the Vatican: but it has lately been described as Mercury, by the abate Visconti. Another was found about 1770, in the Thermæ Maritimæ of Hadrian, near Ostia. It represents Antinous in the mythological character of Abundance, and is now in the collection of the Hon. J. Smith Barry, at Beaumont, in Cheshire.

Some curiosity will be excited to enquire the names of those artists who were so constantly employed, and so amply patronised, by Hadrian. Those only of Aristæus, Papias, and Zeno, occur on the plinths of fragments discovered amongst the Tiburtine ruins.

We are now advancing rapidly to the decline of sculpture among the Romans. Of the two Antonines, M. Aurelius appears to have been the greater friend of the arts. His equestrian statue in bronze in the area of the capitol still defies the competition of the modern artists. This last epoch includes the reigns of Trajan, Hadrian, and the Antonines, and terminates within that of Commodus. It was most remarkable for the character and high finishing of heads intended as portraits, particularly of the imperial busts, as of M. Aurelius, Commodus when young, and of Lucius Verus.

A statue, said to be of that degenerate monster Commodus, in the character of a young Hercules, is in the Belvedere; but the superior style of the hair is a decisive proof, according to the judicious Winckelmann, that it is a genuine Hercules of much higher antiquity.

But a far inferior state of sculpture, in which none of its pristine elegance could be traced, is apparent in the bas-reliefs of two triumphal arches, erected at Rome in the reign of Septimius Severus. The arts, however, cannot be supposed to have declined so suddenly from a scarcity of

those persons who professed them; for many portraits in marble, both of this emperor and his favourite minister Plautianus, afford a convincing proof, that the sculptors were many, yet that the art was in decay.

The several authors who have pursued this inquiry with the most ample and critical investigation are undecided in fixing the exact period of the extinction of the arts at Rome. Some allow no proofs of their existence later than the Gordians; and by others they are extended to the reign of Licinius Gallienus, in the 268th year of Christianity. Why the profession of the arts should, in a great measure, cease, several causes have been given; but the principal and most obvious one is, that when Constantine determined to establish at Byzantium another capital of the Roman world, he pillaged the old metropolis of its most valuable statuary, to embellish a rival city. Those cities of Greece also which were contiguous, supplied, of course, an easy prey. Implicit credit perhaps is not to be given to an author of such questionable veracity as Cedrenus; but from him we learn, that Constantine had collected the Olympic Jupiter of Phidias, the Gnidian Venus of Praxiteles, and a colossal Juno, in bronze, from her temple at Samos; not to detail more of his catalogue. These, according to Nicætas, were broken in pieces, or melted down, at the surrender of the eastern empire, and its metropolis, in 1204, to the French and Venetians. The four bronze horses in the Duomo of St. Mark at Venice were preserved from destruction, and transported in triumph.

From the reigns of the first Byzantine emperors, to the immediate successors of Theodosius, we may perceive a ray of their former genius still animating the Greek artists. The historical column of Arcadius rose in no very unequal emulation of those of Trajan and Antonine at Rome. But from many epigrams of the Anthologia, it is evident that able artists were to be found; and it may be candid to suppose, that such praise was not, in every instance, extravagant or unmerited. At the same time that Rome was laid waste by the Goths, the works in bronze by the artists at Constantinople were held in considerable estimation.

In the conclusion of his History of the Decline and Fall of the Roman Empire, the erudite Gibbon has given a perspicuous account of the causes to which the ruins of Rome may be ascribed.

During the 15th century, Petrarch and Poggius, the celebrated Florentine rhetorician and lawyer, very eloquently describe the dilapidation by which they were surrounded in their view of the imperial city, after many centuries of injury sustained from the Goths, the zeal of the primitive Christians, the civil wars of her own nobility, and the waste of materials, or the gradual decay of time.

Poggius asserts, that six perfect statues only remained of all the former splendour of the mistress of the world. Four were extant in the baths of Constantine; the others were that now on the Monte-cavollo, and the equestrian statue of M. Aurelius. Of these, five were of marble; the sixth and last is of bronze.

Poggius was the first collector of antique statues; and from him the great Cosmo de Medici acquired a love of the arts, and learned to enrich his cabinet with their productions. His successors, with hereditary emulation, exerted every power of wealth and influence to render that cabinet the envy of Europe.

An investigation of the remains of Roman grandeur, so long and sedulously pursued, was rewarded by frequent discoveries of the finest antique sculptures; and the artists of the modern schools established at Florence gave the first proofs of their ingenuity in restoring and adapting those precious fragments.

Many curious particulars relative to the discovery of antique statues in the 16th century may be found in Ficoroni, in an account by Flaminius Vacca, printed at the end of Nardini's Roma Antica, and in Montfaucon. Several of these are also to be found in Dallaway's Anecdotes, from which many parts of this account of the arts have been selected.

Our limits will not permit us to enlarge, or enter into an enquiry as to the comparative merits of the different modern schools of Europe, of which Italy bears away the unrivalled palm through several concurrent circumstances, and of those it is immediately obvious, that piety and superstition are the principal; the legends of their saints produce an incredible variety for illustrating the violent emotions of the soul in ardent devotion and the pangs of martyrdom, and it cannot be disputed, that they have in many instances very nearly approached the expression and excellence of their masters; of those Michael Angelo Buonaroti has been honoured by his countrymen with the title of divine, nor was Bernini much less deserving of this honour.

The French, although favoured with a climate little inferior to that of Italy, and situated upon its borders, have less distinguished themselves in sculpture than might have been expected, but the national character is too volatile for the productions of tedious and incessant exertion, absolutely necessary in the sculptor; hence it is that very few French names are celebrated as statuaries. It would, however, be unjust not to mention Roubillac, who honoured England with his works, which deserve every praise for just conception, and perhaps there is no modern instance of more beautiful contrast than in his monument to the memory of Lady Nightingale in Westminster Abbey, on which the lifeless figure of the dying lady, and the eager and terrified husband, have and ever will be greatly admired. The skeleton wrapped in sepulchral drapery, aiming a dart at the breast of the female, needs no other encomium than that of the celebrated anatomist John Hunter, who pronounced it a most perfect representation. François Girardon should also be mentioned as doing honour to the French nation by his numerous works, and by none more than his tomb of Cardinal Richlieu, originally placed in the college of the Sorbonne at Paris.

The Germans and Dutch have distinguished themselves greatly in painting, but taking the subject in an enlarged point of view, they have done next to nothing in sculpture; neither has the Spanish nation any very strong claim to distinction on this head. The sculpture of Great Britain is almost entirely confined to the interiors and exteriors of churches, and the statues which adorn them are all, without exception, ancient: when the religion of our ancestors was the same as that of the greatest part of the continent of Europe, they gave large sums for the production of shrines and saints without number, but they seem to have had no idea of encouraging the noblest part of the art, by selecting men of superior genius, and employing them on groups or single figures in white marble, the only substance calculated to give due effect to the skill of the statuary; this parsimonious conduct, and probably very indifferent rewards,

was the cause that all our old statues are made of coarse and perishable stone, and that they are in truth little better than copies of each other, which circumstance may be partly accounted for; besides, by the situations they occupied on the walls of sacred edifices, and their being invariably placed in niches, and those in the pointed style of architecture, whence it became a matter of necessity to introduce but one figure, and that in an upright position; yet under all these disadvantages, a competent judge may discover in the majority of the works of our ancient sculptors a freedom and correctness that would, with due encouragement, have produced works little, if at all, inferior to those of the Italian school. If we examine the turns or lines of the faces of the kings and saints, scattered over the surfaces of our cathedrals and some parish churches, it will be found that the artists who made them were capable of expressing dignity and piety, and their drapery is generally correspondent to the position of the limbs, and in large graceful folds. The admirer of this art cannot fail of being highly gratified by tracing the progress of English sculpture in that vast field for observation, Westminster Abbey; where, in the cloisters, they will find the rude figures of abbots coeval with the time of William of Normandy, from which period down to the present moment there is almost an annual succession of figures ornamental and monumental.

The Abbey having been partly rebuilt by Henry III. the structure was continued as the abbots could obtain the means, consequently there is an actual gradation in the excellence of the sculpture down to the reign of Henry VII. The latter monarch determined to excel all his predecessors, and his chapel, or burial-place, is one blaze of rich decoration in every possible direction. Having thus directed the attention of the reader to the place where a perfect knowledge of this subject may be obtained, we shall proceed to notice another branch of the art, which has been continued in Great Britain from the time of the reformation, at which period sculpture received its fiat as far as relates to the use of it for pious purposes. We know but little of the statues which were placed about the altars and shrines of old times in this country, as they were destroyed without mercy; but vast numbers of tombs remain uninjured in every county: in speaking of those, we must premise that very little opportunity was given the artist to expand and improve his ideas, as a slavish custom prevailed of placing all the statues on them in a posture, of all others, the most rigid and ungraceful, which was on their backs, and with the hands joined in prayer: under this obvious disadvantage our ancient sculptors contrived to make many excellent and interesting figures in beautiful transparent alabaster, although almost all the males are represented in armour. As the effigies of persons were frequently accompanied by that of their consort, more scope for genius and variety prevailed in the latter, and consequently we find females in the habits of their times, and represented in the rich ornaments of the sex, and making due allowance for the stiffness of their cumbent position, the drapery is frequently placed in true and well-conceived folds; as to expression in the features beyond a mere state of quiet, as it would not have been proper, it is not to be discovered in any instance. Some of the tombs under consideration are divided into compartments, in each of which small bas reliefs are introduced of the children of the deceased, or monks or nuns telling their beads; these are frequently well executed, and so far so as to make us wish the artist had been indulged to the full extent of his abilities.

It appears, upon an attentive comparison, that the figures executed between the reigns of Henry III. and Henry VII. are infinitely superior to those placed on tombs during and after the time of Henry VIII. as in his and the two preceding reigns the effigies were generally exhibited either kneeling at prayer, or cumbent, in a most miserable taste indeed, which was made still more disgusting by the custom of painting and gilding the drapery. In the period of the interregnum nothing was done in the art of sculpture, as, unfortunately, the era alluded to completed the destruction begun at the reformation, by the application of a blind principle of dislike, which prevented the preservation of the statues of saints, not as objects to excite devotion, but as the only mementos that existed that the art had ever been encouraged in England.

As might have been anticipated, sculpture sunk into a state of total neglect, if not of contempt; but, after the restoration, the ancient habits of the people recurring, statues of the dethroned king, and of his son and successor, were erected in every direction, and in some instances they are tolerable figures; but the monumental of the same date are wretched indeed, as they are clad in Roman armour, and their heads and shoulders sustain enormous wigs. Encouragement increasing, the art began to be roused from its torpid state. Though from the time of the reformation until very recently, it has been almost wholly (as practised in England, we mean) in the hands of foreign artists. Cibber, Gibbons, Rysbrack, Scheemaker, Roubillac, and some others, were employed on all public occasions, to the exclusion of native artists.

The principal works of Cibber are the statues on the front of Bedlam, those of several of our kings round the Royal Exchange, and others at Chatsworth and Cambridge. He was the father of the celebrated dramatic writer, Colley Cibber.

Of Grinling Gibbons is a statue in bronze of James II. now in Scotland-yard, in the Roman costume. In minute ornaments, carved in wood, Gibbons has few equals. His works of that kind are frequent: some of the best are at lord Egremont's at Petworth, Windsor, and the duke of Norfolk's at Holm Lacey. In the chapel of Trinity-college, Oxford, are other striking proofs of his genius.

Rysbrack's first appearance in England was about the year 1720, when the statuaries of Paris, particularly Le Paûtre, Vaucleve, Bouchardon, and Le Gros, enjoyed the first reputation, and had many scholars, whose invention was exhausted in the classical fopperies of the royal gardens. Wherever he acquired the elements of his art, he displayed talents of a masterly artist in England. His bronze equestrian statue of king William at Bristol, and his monument of bishop Hough in Worcester cathedral, are counted among his superior works.

Some of the busts by his hand are, John Baliol, king of Scots, at Baliol college; Alfred, at the university, finished by Wilton; Gibbs, the architect, in the Radcliff library; Dr. R. Friend, archbishop Boulter, and probably the busts of George I. and II. at Christ-church.

Scheemaker has left many valuable works: his statue of Shakspeare, on the monument of our immortal bard, in Westminster-abbey, procured him the greatest celebrity.

Roubillac was a native of Lyons, a city which

has given birth to several French sculptors; to Coysevox, N. Coustou, and l'Amoureux, the cotemporary of Roubillac, and with some probability his fellow-scholar under Coustou. There is a want of simplicity in the works of this artist, from which the celebrated statue of Newton at Trinity-college, Cambridge, is not entirely exempt.

Mr. Nightingale's monument in Westminster-abbey, says Walpole, although finely thought and well executed, is more theatric than sepulchral.

At Christchurch are fine busts of Dr. Matthew Lee, Dr. R. Frewen, and one of the founders at All-souls.

Since the time of the foreign artists above mentioned, many eminent English sculptors have appeared, whose works are to be found in our churches and other public buildings. Wilton, Nollekens, Banks, Bacon, Flaxman, Westmacott, Chantrey, are some of the most conspicuous names of our modern school. Wilton executed some good monuments in Westminster-abbey; Nollekens has established a fame which has been increasing through a long life of constant practice; his statue of the late Mr. Pitt recently placed in the Senate-house, at Cambridge, being a most exquisite performance, and justly esteemed a rival of Roubillac's fine statue of Newton, in the chapel of Trinity college, just mentioned.

The characteristic merits of Banks and Bacon are thus described by Mr. Hoare, in his Inquiry into the State of The Arts in England. "Banks was among those who most zealously sought the enlargement of professional knowledge in the stores of Rome. A mind ardently roused to competition with the works of excellence which he beheld, and a hand trained from infancy to a ready expression of his conceptions, imparted to his productions an air of ancient art.

"Bacon's genius was of native growth; he traversed no distant regions for improvement of his art, but drew from the researches of others sufficient food for an active and ready fancy. His conceptions were quick and sparkling, his execution polished, and his whole work characteristically graceful."

The sculpture of Flaxman denotes a chaste and correct taste, founded on the most critical study of the works of Grecian art.

Westmacott is an able pupil of the Venetian Canova.

England also boasts her female sculptors. The Hon. Mrs. Damer, and the illustrious actress Siddons, have shewn distinguished talents in this art.

Whether sculpture be more ancient than painting, or not, if we examine the style of ancient painting we shall find reason to conclude, that sculpture stood first in the public esteem: as the ancient painters have evidently imitated the statuaries, even to their disadvantage; since their works have not that freedom of style, more especially with respect to their composition and drapery, which the pencil might easily acquire to a greater degree than that of the chisel; but as this is universally the case, it cannot be attributed to any thing else besides the higher estimation of the works on which they formed themselves. Which is the most difficult art has been a question often agitated. Painting has the greatest number of requisites, but at the same time her expedients are the most numerous; and, therefore, we may venture to affirm, that, whenever sculpture pleases equally with a painting, the sculptor is certainly the greatest artist. Sculpture has indeed had the honour of giving law to all the schools of design, both ancient and modern, with respect to purity of form. The reason, perhaps, is, that being divested of those meretricious ornaments by which painting is enabled to seduce its admirers, it is happily forced to seek for its effect in the higher excellencies of the art: hence elevation in the idea, as well as purity and grandeur in the forms, are found in greater perfection in sculpture than in painting. Besides, whatever may be the original principles which direct our feelings in the approbation of intrinsic beauty, they are, without doubt, very much under the influence of association. Custom and habit will necessarily give a false bias to our judgment: it is, therefore, natural, and in some measure reasonable, that those arts which are temporaneous, should adapt themselves to the changes of fashion, &c. But sculpture, by its durability, and consequent application to works of perpetuity, is obliged to acquire and maintain the essential principles of beauty and grandeur, that its effect on the mind may be preserved through the various changes of mental taste. It is conceived, that it will scarcely admit of a question, whether the ancients or moderns have most excelled in this art; the palm having been so universally adjudged to the former. To determine in what proportion they are superior is too difficult an attempt. Wherever there is a real superiority in any art or science, it will in time be discovered; but the world, ever fond of excess, never stops at the point of true judgment, but dresses out its favourite object with the ornaments of fancy, so that even every blemish becomes a beauty. "This it has done," says Mr. Bacon, "by ancient sculpture to such a degree as not to form its judgment of that by any rules, but to form an opinion of rules by the example. As long as this is the case, modern art can never have a fair comparison with the ancient. This partiality to the ancients is so strong as to prevent almost all discrimination; and is the sole reason, why many antiques, that now stand as patterns of beauty in the judgment of most connoisseurs, are not discovered to be copies. This is not more important than it is easy to be perceived by a judicious eye; for wherever there is a grandeur or elegance to an eminent degree in the idea and general composition of a statue, and when the execution of the parts (called by artists the treating of the parts) betrays a want of taste and feeling, there is the greatest reason to conclude, that the statue is a copy, though we were ever so certain of its antiquity. And surely if evidence of a picture's being a copy proportionably diminishes its value, the same rule of judgment may be no less properly applied to a statue. Modern and ancient art can never, therefore, be fairly compared, till both are made to submit to the determination of reason and nature. It may be observed, that the ancients have chiefly confined themselves to the sublime and beautiful; and whenever a pathetic subject has come before them, they have sacrificed expression to beauty. The famous group of Niobe is one instance of this kind; and, therefore, however great our partiality to the ancients may be, none can hesitate to affirm, that, whenever the moderns shall unite great expression with great beauty, they will wrest the palm out of their hands."

To SCU'LPTURE. *v. a.* (from the noun.) To cut; to engrave (*Pope*).

SCUM. *s.* (*escume*, Fr. *schuym*, Dutch.) 1. That which rises to the top of any liquor

(*Bacon*). 2. The dross; the refuse; the recrement; that part which is thrown away (*Addison*).

To SCUM. *v. a.* (from the noun.) To clear off the scum; to skim (*Lee*).

SCU'MMER. *s.* (*escumoir*, Fr.) A vessel with which liquor is scummed; a skimmer.

SCU'PPER HOLES. *s.* (*schoepen*, Dutch, to draw off.) In a ship, small holes on the deck, through which water is carried into the sea.

SCURF. *s.* (ꝛcuꝛꝼ, Sax. *skurff*, Danish.) 1. A kind of dry miliary scab (*Swift*). 2. A soil or stain adherent (*Dryden*). 3. Any thing sticking on the surface (*Addison*).

SCU'RFINESS. *s.* (from *scurf*.) The state of being scurfy.

SCU'RRIL. *a.* (*scurrilis*, Latin.) Low; mean; grossly opprobrious; lewdly jocose (*Ben Jonson*).

SCURRI'LITY. *s.* (*scurrilitas*, Lat.) Grossness of reproach; lewdness of jocularity; mean buffoonery (*Shakspeare*).

SCU'RRILOUS. *a.* (*scurrilis*, Lat.) Grossly opprobrious; using such language as only the licence of a buffoon can warrant; lewdly jocular; vile; low (*Hooker*).

SCU'RRILOUSLY. *ad.* With gross reproach; with low buffoonery (*Tillotson*).

SCU'RRILOUSNESS. *s.* (from *scurrilous*.) Scurrility; baseness of manners.

SCU'RVILY. *ad.* (from *scurvy*.) Vilely; basely; coarsely (*South*).

SCURVY. See SCORBUTUS.

SCURVY GRASS. See COCHLEARIA.

SCU'RVY. *a.* (from *scurf*, *scurfy*, *scurvy*.) 1. Scabbed; covered with scabs; diseased with the scurvy (*Leviticus*). 2. Vile; bad; sorry; worthless; contemptible; offensive (*Swift*).

'SCUSES, for *excuses* (*Shakspeare*).

SCUT. *s.* (*skott*, Islandic.) The tail of those animals whose tails are very short, as of a hare or rabbit.

SCUTAGE was anciently a tax imposed on such as held lands, &c. by knight's service, towards furnishing the king's army: hence scutagio habendo was a writ that lay for the king, or other lord, against tenants, holding by knight's service, to serve in person, or send a sufficient man in their room, or pay a certain sum, &c.

SCUTARI, a strong town of Turkey in Europe, capital of Upper Albania, with a bishop's see. It is seated on the lake Zeta, at the mouth of the river Bocana, 20 miles N.E. of Antivari, and 47 N.W. of Albanopolis. Lon. 19. 25 E. Lat. 42. 35 N.

SCUTARI, a town of Turkey in Asia, in Natolia, with a good harbour seated on the E. side of Constantinople, of which it is considered as a suburb, being directly opposite. It contains a handsome mosque, and is built on the side of a hill. Lon. 29. 4 E. Lat. 41. 0 N.

SCUTCHEON, See ESCUTCHEON and HERALDRY.

SCUTEL, in botany, applied to the fructification. (dimin. from *scutum*, a buckler.) Fructificatio (lichenum) orbiculata concava, margine undique elevato.—An orbicular concave fructification (in some lichens), with the edge raised all round. The pelt is flat.

SCUTEL, in entomology, the portion on the back of an insect which is situated between the thorax and abdomen.

SCUTELLARIA. Scull-cap. In botany, a genus of the class didynamia, order gymnospermia. Calyx with the border nearly entire, closed and covered with a lid after flowering. Eighteen species, scattered over the globe; two common to the marshes and ditches of our own country. The following are cultivated.

1. S. integrifolia. Entire-leaved skull-cap, with ovate entire leaves; and purple flowers in long loose spikes. A native of North America.

2. S. peregrina. Florentine skull-cap, with hairy stem two feet high; the flowers purple or white. A native of Italy.

3. S. altissima. Tall skull-cap. Flowers purple with long tubes. A native of the Levant.

These may be all raised from seeds, sown either in spring or autumn, in the places where they are to remain. They afford variety in borders and clumps.

SCUTE'LLATED. *a.* (*scutella*, Latin.) Divided into small surfaces (*Woodward*).

SCU'TIFORM. *a.* (*scutiformis*, Latin.) Shaped like a shield.

SCU'TTLE. *s.* (*scutella*, Lat.) 1. A wide shallow basket, so named from a dish or platter which it resembles in form (*Hakewill*). 2. A small grate (*Mortimer*). 3. (from *scud*.) A quick pace; a short run; a pace of affected precipitation (*Spectator*).

To SCU'TTLE. *v. n.* (from *scud* or *scuttle*.) To run with affected precipitation (*Arbuthnot*).

SCUTTLES, in a ship, square holes cut in the deck, big enough to let in the body of a man, serving to let people down into any room below upon occasion, or from one deck to another. They are generally before the mainmast, before the knight in the forecastle; in the gun-room, to go down to the stern-sheets; in the round-house, to go down into the captain's cabin, when forced by the enemy in a fight aloft. There are also some smaller scuttles, which have gratings over them: and all of them have covers that people may not fall down through them in the night.

Scuttle is also a name given to those little windows and long holes which are cut out in cabins to let in light.

SCYBALA, in medicine. (σκυβαλα.) Dry, hard excrements.

SCYLAX, a geographer and mathematician of Caria, about 550 years before Christ. He was commissioned by Darius, the son of Hystaspes, to make discoveries in the east, and after a journey of 30 months he visited Egypt. Some suppose that he was the first who invented geographical tables. The Periplus of Scylax was published by Gronovius in quarto, 1697.

SCYLLA, a daughter of Nisus, king of

Megara, who became enamoured of Minos, who besieged her father's capital. She informed him that she would deliver Megara into his hands, if he promised to marry her. Minos consented, and as the fate of Megara depended on a golden hair, on the head of Nisus, Scylla cut it off, and the enemy easily became master of the place. Minos after this treated her with such contempt, that she threw herself into the sea, or, according to other accounts, she was changed into a lark by the gods, and her father into a hawk.—2. A daughter of Typhon, or, of Phorcys, who was greatly loved by Glaucus, one of the deities of the sea. Glaucus, in order to render her more propitious, applied to Circe, whose knowledge of herbs and incantations was universally admired. Circe herself became enamoured of him, and attempted to make him forget Scylla, but in vain. To punish her rival, Circe poured the juice of some poisonous herbs into the waters of the fountain where Scylla bathed, and no sooner had the nymph touched the place, than she found every part of her body below the waist changed into frightful monsters like dogs, which never ceased barking. The rest of her body assumed an equally hideous form. This sudden metamorphosis so terrified her, that she threw herself into that part of the sea which separates the coast of Italy and Sicily, where she was changed into rocks, which continue to bear her name, and which were universally deemed very dangerous to navigators, as well as the whirlpool of Charybdis.

Scylla, a rock near the entrance of the strait of Messina, on the coast of Calabria opposite the celebrated Charybdis. It forms a small promontory in the narrowest part of the strait, and is the famous Scylla of the ancient poets. It does not come up to the formidable description given by Homer, nor is the passage so narrow and difficult as he represents it; but it is probable that its breadth is greatly increased since his time. The rock is nearly 200 feet high; and on the side of it stands the town of Sciglio, whence the promontory is sometimes called Cape Sciglio. But for a more minute description, see Charybdis.

Scylla, or Sciglio, a town of Sicily, situate on the side of the rock Scylla. In the terrible earthquake of 1783 (see Calabria) a wave of the sea, which had swept the country for three miles, carried off, on its return, 2473 of the inhabitants, with the prince at their head. It is 10 miles N.E. of Messina.

SCYLLARUS. In the entomology of Fabricius, a tribe of the genus Cancer, which see.

SCYLLÆA, in zoology, a genus of the class vermes, order mollusca. Body compressed and grooved along the back; mouth consisting of a terminal, toothless aperture; tentacles or arms three on each side, and placed beneath. Two species only, as follow.

1. S. pelagica. Body fixed; the four extreme arms alike, the middle ones papillous. Inhabits the ocean among floating sea-weeds, and found at times on our own coasts.

2. S. gomphodensis. Body detached; first pair of arms naked and hollow at the tip, the others with branched fibres within. Inhabits the Red Sea.

SCYROS, a rocky and barren island in the Ægean, at the distance of about 28 miles north-east from Eubœa, sixty miles in circumference. Achilles retired there in order to avoid going to the Trojan war.

SCYTALA LACONICA, in antiquity, a stratagem or device of the Lacedemonians, for the secret writing of letters to their correspondents, so that, if they should chance to be intercepted, nobody might be able to read them. To this end they had two wooden rollers or cylinders, perfectly alike and equal; one whereof was kept in the city, the other by the person to whom the letter was directed. For the letter, a skin of very thin parchment was wrapped round the roller, and thereon was the matter written; which done, it was taken off, and sent away to the party, who, upon putting it in the same manner upon his roller, found the lines and words in the very same disposition as when they were first written. This expedient they set a very high value on; though, in truth, artless and gross enough: the moderns have improved vastly on this method of writing. See Cipher.

SCYTHE, or Sithe, an instrument of husbandry employed for the purpose of cutting grass, and also for the mowing of corn.

Before we attempt a description of the latest improvements on this rural instrument, we shall briefly observe, that the well known Hainault, or French scythe, for reaping wheat, has of late years met with many advocates in Britain. It consists, according to the description given by Dr. Templeman, of a short blade, being one-third of the length of those commonly used in England; with a wooden handle to be held in the right hand, having a bend and a broad rounded piece at the upper end, for the support of the arm. Further, an iron hook is fixed to a staff, four feet in length, made of oak or ash, to be used with the left hand, with a mortise near the end, for the conveniency of the husbandman's carrying the scythe on his shoulder. On the handle of the scythe, and staff of the hook, at about half a yard from the bottom, are placed leather loops for the fingers, to keep the two grasps at proper distances from the ground.

Having already stated the disadvantages, which cannot be avoided in the use of sickles for cutting corn under the head of husbandry, and likewise pointed out the superior utility of scythes, we shall now give a description of two instruments, which are eminently calculated for both purposes. These scythes were first introduced to public notice by the Patriotic Society of Milan, in one of the earlier volumes of their transactions. Convinced of the inconveniences arising from the use of the common instruments, they procured a model of a

Silesian scythe, with which the corn of that country is uniformly mown. Having caused a similar instrument to be constructed, it was accordingly tried; and, notwithstanding its imperfect manufacture, as well as this circumstance, that the labourer had never used a scythe on such principles, it was fully proved, that nearly half the usual time was saved, and the fatigue or labour was considerably lessened. Further, the corn was thus cut without receiving any injury from the concussion in falling to the ground, on which it was spread in a regular manner, so that it could be easily formed into sheaves. The Milanese Society was afterwards presented with an Austrian implement, different from the Silesian in a few respects, which will be noticed in the subsequent account.

Figure 6, Pl. 154, represents the Silesian scythe, which varies little from that commonly employed for mowing grass; the blade, however, is somewhat smaller, and has four wooden teeth which are fixed parallel to it, with a view to prevent the grain from being scattered, when it is cut: so that the labourer is enabled to lay it on the ground in an even and regular way. *a*, *b*, the handle, which is two Milanese brasses and nine inches and a half, or about four feet and four inches English measure, in length. *b*, *c*, represents the blade, being one brass, and three and a half Milanese inches, or about two feet one inch long.—The piece of wood, in which the teeth are inserted, is one brass, one inch and a half, or nearly two feet in length.

The Austrian scythe greatly resembles the instrument above delineated, excepting that the blade is larger, and the number of wooden teeth is increased to five, which are consequently longer.

The Patriotic Society of Milan observe in their Memoir, that the difference in the construction of these two implements, will render it necessary to employ each of them in a peculiar manner, which can only be acquired by practice. They further remark, that though, in mowing grass, the feet are kept in a direction nearly parallel to each other, it will be advisable to place them, when corn is reaping, in a line, one behind the other, the right foot being thrust forward, and the left drawn towards it; because, in the latter case, if they were advanced in a parallel manner, the labourer would be obliged to turn and bend his body in a very inconvenient posture.

Such of our agricultural readers as are accustomed to the use of the common scythe, will easily ascertain the most suitable and advantageous mode of employing the instrument now described: and, before we complete the history of the new implements, it will not be too great a digression from the subject to give (from the Domestic Encyclopædia) the manner of reaping wheat in Flanders, by means of a very simple scythe, greatly resembling that above explained by Dr. Templeman; and a model of which is preserved in the Repository of the Society for the Encouragement of Arts, &c. in London. Another account, as well as a representation of this useful implement, was communicated to the public by Mr. Adam Walker, in 1788, and inserted in the 9th volume of Annals of Agriculture, where he observes, that corn, thick clover, and vetches, are thus cut down with great regularity, and such expedition, as to surpass the sickle, in the proportion of three to one.

After the above-given descriptions, and observations, relative to the Silesian scythe, had been published, the Milanese Patriotic Society made additional experiments, from which it appeared, that when the stalks of corn are bent down in consequence of heavy rains, the wooden teeth are apt to catch some of the ears, to the stalks of which the blade does not extend; and this not being cut below, the ears are pulled down and the grain is scattered. This accident happens principally, when the labourers, not being sufficiently acquainted with the use of the scythe, are unable to adapt it to particular circumstances.

To remedy these inconveniences, it occurred to an ingenious blacksmith, to add a collector or gatherer, made of cloth, the construction of which is represented in the plate at fig. 7. *a*, *b*, *c*, is a common scythe. *c*, *d*, *m*, *l*, *o*, *f*, *n*, *e*, the gatherer; which at *c*, *d*, *e*, is composed of a thin iron plate; having a cavity at its extremity, for receiving the point of the blade. At *e*, *d*, are holes for sewing in the cloth, which is light, coarse, and cheap: it is likewise fixed to two thick iron wires, the upper of which is continued to *f*, where it terminates in a hole, in the handle:—the other is secured to the back of the blade. The method of fixing the gatherer to such blade will be more clearly understood by referring to the figure, delineated in the plate, fig. 2. and representing one of the irons, which are secured by means of screws to the back of the scythe. These irons proceed from, and constitute a part of, the upright irons, *m*, *n*, *l*, *o*, that serve to keep the gatherer extended.

This contrivance is very simple and cheap; an attempt, however, has been made to simplify it still further, by substituting for the gatherer two iron hoops, represented in the figure last referred to, by the dotted lines, marked *h*, *g*, *k*, *i*, with a cross-piece that serves to connect them; thus saving the cloth and iron plate before described.—Experiments, however, have been made with both these implements; from the result of which it appears, that the gatherer is, upon the whole, preferable to the hoops, as no ears of corn are left behind; and that the latter alteration promises to be most serviceable, when there is no short corn, that can insinuate itself between such iron hoops.

SCYTHES, or SCYTHA, a son of Jupiter by a daughter of Tellus. Half his body was that of a man, and the rest that of a serpent. He became king of a country which he called Scythia.

SCYTHIA, a large country situate on the most northern parts of Europe and Asia. The boundaries of Scythia were unknown to the ancients, as no traveller had penetrated beyond the vast tracts of land which lay at the north, east, and west. Scythia comprehended the modern kingdoms of Tartary, Russia in Asia, Siberia, Muscovy, the Crimea, Poland, part of Hungary, Lithuania, the northern parts of Germany, Sweden, Norway, &c. The Scythians were divided into several nations or tribes, they had no cities, but continually changed their habitation. They inured themselves to bear labour and fatigue; they despised money, and lived upon milk, and covered themselves with the skins of their cattle. Some authors represent them as a savage people, who fed upon human flesh, drank the blood of their enemies, and used the skulls of travellers as vessels in their sacrifices to their gods.

Although the ancient Scythians were celebrated as a warlike people, yet their history is too uncertain and obscure to enable us to give any detail which would not prove equally tiresome and uninteresting to the reader. Mr. Pinkerton, in a dissertation on their origin, endeavours to prove that they were the most ancient of nations; and he assigns for the place of their first habitation the country known by the name of Persia. From Persia, he thinks, they proceeded in numerous hordes westward, surrounded the Euxine, peopled Germany, Italy, Gaul, the countries bordering on the Baltic, with part of Britain and Ireland. That the Scythians were of Asiatic origin cannot, we think, be questioned; and as Persia was peopled at a very early period, it may not improbably have been their parent country: but when our author contends that their empire had subsisted for more than 1500 years before Ninus the founder of the Assyrian monarchy, and that it extended from Egypt to the Ganges, and from the Persian gulf and Indian sea to the Caspian, we cannot help thinking that his prejudices against the Celts, and his desire to do honour to his favourite Goths, have made him advance a paradox inconsistent with the most authentic records of antiquity. His dissertation however is ingenious, and replete with a variety of curious learning.

SCYTHROPS, in zoology, a genus of the class aves, order picæ. Bill large, convex, sharp-edged, channelled at the sides, hooked at the point; nostrils naked, rounded at the base of the bill; tongue cartilaginous, split at the point; feet climbers; colour of the bill pale brown, tipt with yellowish; head, neck, and under parts of the body pale blueish-grey; back, wings, and tail cinereous, the feathers mostly with dusky-blackish tips. This describes the only species yet discovered, scythrops psittaceus, which inhabits New South Wales; the size of a crow; but which from the length of its tail measures two feet two inches in length.

To SDEIGN. *v. a.* (*sdegnare*, Ital.) To disdain (*Milton*).

SDEI'GNFUL. *a.* Disdainful (*Spenser*).

SEA. *s.* (ræ, Sax. *see*, or *zee*, Dutch.) 1. The ocean; the water, opposed to the land (*Milton*). 2. A collection of water; a lake (*Matthew*). 3. Proverbially for any large quantity (*King Charles*). 4. Any thing rough and tempestuous (*Milton*). 5. *Half* SEAS *over*. Half drunk (*Spectator*).

SEA, in a general sense, the great reservoir of water into which the lakes and rivers empty themselves, and from which is again drawn by evaporation that moisture which, falling in showers of rain, fertilizes the earth, and supplies the waste of the springs and rivers.

The absolute quantity of sea-water cannot be ascertained, as its mean depth is unknown. M. de la Place has demonstrated that a depth of four leagues is necessary to reconcile the height to which the tides are known to rise in the main ocean with the Newtonian theory of the tides. If we suppose this to be the mean depth, the quantity of water in the ocean must be immense. Even on the supposition that its mean depth is not greater than the fourth part of a mile, its solid contents (allowing its surface to be three-fourths of that of the superficies of the earth) would be 32,058,939¾ cubic miles.

Buffon supposed that the surface of our globe is equally divided between land and water, and has accordingly calculated the superficies of the sea to be 85,490,506 square miles. But it is well known that the ocean covers much more than half of the earth's surface. Buffon believed the existence of a vast southern continent, which captain Cook has shewn to be visionary. It was this circumstance which misled him. According to the most accurate observations hitherto made, the surface of the sea is to the land as three to one; the ocean, therefore, extends over 128,235,759 square miles, supposing the superficies of the whole globe to be 170,981,012 square miles. To ascertain the depth of the sea is still more difficult than its superficies; both on account of the numerous experiments which it would be necessary to make, and the want of proper instruments for that purpose. Beyond a certain depth the sea has hitherto been found unfathomable; and though several very ingenious methods have been contrived to obviate this difficulty, none of them has completely answered the purpose. We know in general that the depth of the sea increases gradually as we leave the shore; but if this continued beyond a certain distance, the depth in the middle of the ocean would be prodigious. Indeed the numerous islands every where scattered in the sea demonstrate the contrary, by showing us that the bottom of the water is unequal, like the land; and that, so far from uniformly sinking, it sometimes rises into lofty mountains. If the depth of the sea is in proportion to the elevation of the land, as has generally been supposed, its greatest depth will not exceed five or six miles, for there is no mountain six miles perpendicular above the level of the sea. The sea has never been actually sounded to a greater depth than a mile and sixty-six feet; every

thing beyond that therefore rests entirely upon conjecture and analogical reasoning, which ought never to be admitted to determine a single point that can be ascertained by experiment, because, when admitted, they have too often led to false conclusions. Along the coasts, where the depth of the sea is in general well known, it has always been found proportioned to the height of the shore: when the coast is high and mountainous, the sea that washes it is deep; when, on the contrary, the coast is low, the water is shallow. Whether this analogy holds at a distance from the shore, experiments alone can determine.

To calculate the quantity of water contained in the sea, while its depth is unknown, is impossible. But if we suppose with Buffon that its medium depth is the fourth part of a mile, the ocean, if its superficies is 128,235,759 square miles, will contain 32,058,939,75 cubic miles of water.

Let us now endeavour to compute the quantity of water which is constantly discharged into the sea. For this purpose let us take a river whose velocity and quantity of water are known, the Po, for instance, which, according to Riccioli, is 1000 feet (or 100 perches of Boulogne) broad, ten feet deep, and runs at the rate of four miles in an hour; consequently that river discharges into the sea 200,000 cubic perches of water in an hour, or 4,800,000 in a day. A cubic mile contains 125,000,000 cubic perches; the Po therefore will take twenty-six days to discharge a cubic mile of water into the sea. Let us now suppose, what is perhaps not very far from the truth, that the quantity of water which the sea receives from the rivers in any country is proportioned to the extent of that country. The Po from its origin to its mouth traverses a country 380 miles long, and the rivers which fall into it on every side rise from sources about sixty miles distant from it. The Po, therefore, and the rivers which it receives, water a country of 45,600 square miles. Now since the whole superficies of the dry land is about 42,745,253 square miles, it follows, from our supposition, that the quantity of water discharged by all the rivers in the world, in one day, is thirty-six cubic miles. If, therefore, the sea contains 32,058,939 cubic miles of water, it would take all the rivers in the world 2439 years to discharge an equal quantity.

It may seem surprising that the sea, since it is continually receiving such an immense supply of water, does not visibly increase, and at last cover the whole earth. But our surprise will cease, if we consider that the rivers themselves are supplied from the sea, and that they do nothing more than carry back those waters which the ocean is continually lavishing upon the earth. Dr. Halley has demonstrated that the vapours raised from the sea and transported upon land are sufficient to maintain all the rivers in the world. The simplicity of this great process is astonishing: the sea not only connects distant countries, and renders it easy to transport the commodities of one nation to another, but its waters rising in the air descend in showers to fertilise the earth and nourish the vegetable kingdom, and collecting into rivers flow onwards, bringing fertility and wealth and commerce along with them, and again return to the sea to repeat the same round.

As the sea covers so great a portion of the globe, we should no doubt, by exploring its bottom, discover a vast number of interesting particulars. Unfortunately, in the greater part of the ocean, this has hitherto been impossible. Part, however, has been examined; and the discoveries which this examination has produced may enable us to form some idea at least of the whole. The bottom of the sea, as might have been conjectured indeed beforehand, bears a great resemblance to the surface of the dry land, being, like it, full of plains, rocks, caverns, and mountains; some of which are abrupt and almost perpendicular, while others rise with a gentle declivity, and sometimes tower above the water and form islands. Neither do the materials differ which compose the bottom of the sea and the basis of the dry land. If we dig to a considerable depth in any part of the earth, we uniformly meet with rock; the same thing holds in the sea. The strata too are of the same kind, disposed in the same manner, and form indeed but one whole. The same kind of mineral and bituminous substances are also found interspersed with these strata; and it is to them probably that the sea is indebted for its bitter taste. Over these natural and original strata an artificial bed has pretty generally been formed, composed of different materials in different places. It consists frequently of muddy tartareous substances firmly cemented together, sometimes of shells or corol reduced to powder, and near the mouths of rivers it is generally composed of fine sand or gravel.

The ocean differs more in saltness in different climates towards the equator than nearer the poles. This seems to arise from the different quantities of water which are evaporated, in proportion to those which fall in rain. One pound of sea-water in the Baltic yields about a quarter of an ounce of salt; near Holland half an ounce; and in the British seas about two ounces. Boyle has also observed, that in places of great depth the water is saltest at the bottom.

In the voyage made towards the north pole in 1773, it was found that the sea-water at the Nore contained not quite one thirty-sixth of salt; at the back of Yarmouth sands, not quite one thirty-second; off Flamborough Head, rather more than one twenty-ninth; off Scotland, rather less than one twenty-ninth; latitude 74°, at sea, one twenty-ninth; and in latitude 78°, rather less than one twenty-eighth.

The cause of the saltness of the ocean has been a subject of investigation among philosophers in almost all ages, but it still remains in great obscurity. There can be little doubt that a large quantity of saline matter existed in

this globe from the creation; and at this day, we find immense beds of sal gem, or common salt, buried in the earth, particularly at Cracow; but whether these collections have been derived from the ocean, and deposited in consequence of the evaporation of its waters in certain circumstances; or whether the ocean was itself originally fresh, and received its salt from collections of saline matter situated at its bottom, or from that brought by the influx of rivers; cannot now be ascertained. No accurate observations on the degree of saltness of the ocean in particular latitudes were made till the present century, and it is not possible, therefore, to ascertain what was the state of the sea at any considerable distance of time, nor, consequently, whether its degree of saltness increases, decreases, or is stationary. From differences among aquatic animals, however, some of which seem adapted to salt water, and some to fresh, it is probable, that both these states of water existed from the creation of the world. We know, it is true, that some kinds of fish, as salmon, are capable of existing both in fresh and in salt water, and that habit has a powerful influence over all animals; but this is not sufficient to refute the main fact, that some kinds of fish thrive only in salt water, others in fresh; some in standing pools, and others in rapid currents.

That excellent philosopher and chemist, the bishop of Landaff, has recommended a most simple and easy mode of ascertaining the saltness of the sea in any latitude; and as the language, in point of perspicuity and correctness, cannot be improved, we take the liberty of inserting it in his own words:

"As it is not every person who can make himself expert in the use of the common means of estimating the quantity of salt contained in sea-water, I will mention a method of doing it which is so easy and simple, that every common sailor may understand and practise it, and which, from the trials I have made of it, seems to be as exact a method as any that has yet been thought of. Take a clean towel, or any other piece of cloth, dry it well in the sun or before the fire, then weigh it accurately, and note down its weight; dip it in the sea-water, and when taken out, wring it a little till it will not drip, when hung up to dry; weigh it in this wet state, then dry it either in the sun or at the fire, and, when it is perfectly dry, weigh it again. The excess of the weight of the wetted cloth above its original weight, is the weight of the sea-water imbibed by the cloth; and the excess of the weight of the cloth after being dried, above its original weight, is the weight of the salt retained by the cloth; and by comparing this weight with the weight of the sea-water imbibed by the cloth, we obtain the proportion of salt contained in that species of sea-water.

"Whoever undertakes to ascertain the quantity of salt, contained in sea-water, either by this or any other method, would do well to observe the state of the weather preceding the time when the sea-water is taken out of the sea, for the quantity of salt contained in the water near the surface may be influenced both by the antecedent moisture and the antecedent heat of the atmosphere."

Whether the sea is salter or not at different depths, notwithstanding Mr. Boyle's observations before quoted, has not yet been properly ascertained; but that its temperature varies considerably in proportion to the depth we have decisive proof.

"With respect to the temperature," says bishop Watson, "of the sea at different depths, it seems reasonable enough to suppose, that in summer time it will be hotter at the surface than at any considerable depth below it, and that in winter it will be colder.

"Mr. Wales describes the instrument he made use of for trying the temperature of the sea at different depths, in the following terms: 'The apparatus for trying the sea-water at different depths consisted of a square wooden tube of about eighteen inches long and three inches square externally. It was fitted with a valve at the bottom, and another at the top, and had a contrivance for suspending the thermometer exactly in the middle of it. When it was used it was fastened to the deep sea-line, just above the lead, so that all the way as it descended the water had a free passage through it, by means of the valves which were then both open; but the instant it began to be drawn up, both the valves closed by the pressure of the water, and of course the thermometer was brought up in a body of water of the same temperature with that it was let down to.' With this instrument, which is much the same with one formerly described by Mr. Boyle, in his observations about the saltness of the sea, water was fetched up from different depths, and its temperature accurately noticed, in different seasons and latitudes.

"August 27, 1772, south latitude 24°. 40'. The heat of the air was 72½,—of the water at the surface 70,—of water from the depth of 80 fathoms 68.

"December 27, 1772, south latitude 58°, 21'. The heat of the air was 31,—of the water at the surface 32,—of water from the depth of 160 fathoms 33½.

"In the voyage to the high northern latitudes before mentioned, they made use of a bottle to bring up water from the bottom, which is thus described: 'The bottle had a coating of wool, three inches thick, which was wrapped up in an oiled skin, and let into a leather purse, and the whole inclosed in a well-pitched canvas bag, firmly tied to the mouth of the bottle, so that not a drop of water could penetrate to its surface. A bit of lead shaped like a cone, with its base downwards, and a cord fixed to its small end, was put into the bottle; and a piece of valve leather, with half a dozen slips of thin bladder, were strung on the cord, which, when pulled, effectually corked the bottle on the inside.' We have here put down two of the experiments which were made during that voyage.

"August 4, 1773, north latitude 80° 30'.

The heat of the air was 32,—of the water at the surface 36,—of water fetched up from the depth of 60 fathoms under the ice 39.

"September 4, 1773, north latitude 65°. The heat of the air was 66½, of the water at the surface 55,—of water from the depth of 683 fathoms 40.

"It appears from all these experiments that, when the atmosphere was hotter than the surface of the sea, the superficial water was hotter than that at a great depth; and when the atmosphere was colder than the surface of the sea, it is evident that the superficial water was somewhat colder than at a considerable distance below it."

Sea-water may be rendered fresh by freezing, which excludes or precipitates the saline particles; or by distillation, which leaves the salt in a mass at the bottom of the vessel. Upon these principles, a mode of obtaining a supply of fresh water at sea was recommended some years ago to the admiralty, by Dr. Irving. It consisted in only adapting a tin tube of suitable dimensions to the lid of the common ship's kettle, and condensing the steam in a hogshead which served as a receiver. By this mode a supply of twenty-five gallons of fresh water per hour might be obtained from the kettle of one of our ships of war.

The saline taste of sea-water, is chiefly derived from common salt which it holds in solution. Sea-water is also distinguished by a nauseous bitter taste, which is ascribed to the animal and vegetable matters which are floating in it. This taste has been considered as in some measure foreign to it, for it is only found in the water on the surface of the ocean, or near the shores. Sea-water, taken up at considerable depths, contains only saline matters. The specific gravity of sea-water varies from 1.027 to 1.028. Its greater density is owing to the salts which are dissolved in it; and to this impregnation also it is owing, that it is not frozen till the temperature is reduced nearly to 28°. The salts which are chiefly found in sea-water, are muriat of soda, or common salt, muriat of magnesia, sulphat of magnesia, sulphat of lime and soda. The quantity of saline ingredients in the waters of the ocean varies from $\frac{1}{24}$ to $\frac{1}{32}$ part. Mr. Kirwan makes the average quantity about $\frac{1}{28}$ of its whole weight. The quantity of saline contents of water, taken up by lord Mulgrave at the back of Yarmouth sands, in latitude 53°, amounted nearly to $\frac{1}{32}$; while Bergman found the water taken up in the latitude of the Canaries, to contain about $\frac{1}{24}$ of its weight of saline matter. These quantities, however, vary even in the same latitude, during rainy and dry seasons, near the land, or the mouths of great rivers. The difference of latitude does not seem to make any considerable difference in the proportion of saline matter. In latitude 80° north, sixty fathoms under ice, sea-water taken up by lord Mulgrave, yielded about $\frac{1}{29}$; in latitude 74°, nearly the same; and in latitude 60, $\frac{1}{28}$. Pages obtained four per cent. from water taken up in latitude 81°, and the same quantity of saline matter from water taken up in latitudes 45° and 39° north. In southern latitudes the proportion was still greater; he found it to contain the following proportions: in the Mediterranean the proportion is said to be still greater; but the Euxine and Caspian seas are found to be less salt than the ocean. This is also the case with the Baltic. If the saline matters of the waters of the ocean did not consist of different kinds, the proportion of salts which it contains might be ascertained by the specific gravity. The experiments of Mr. Wilcke show that the proportion of saline matter in the Baltic is less than that of the ocean: and that it is salter during the prevalence of a westerly wind, by which the water is driven from the ocean, than during an easterly wind. The proportions of the different salts in an analysis, by Bergman, are the following, as relating to the sea generally:

Muriat of soda	30.911
Muriat of magnesia	6.222
Sulphat of lime	1.000
	38.133

In 1000 parts of water taken up near Dieppe, Lavoisier found the following salts:

Muriat of soda	1375
Muriat of lime and magnesia	256
Muriat of magnesia	156
Lime	87
Sulphat of soda and magnesia	84
	1958

or almost one-fifth of saline contents; but this proportion is undoubtedly excessive.

The specific gravity of the Baltic water, ascertained by Wilcke under different circumstances, and reduced by Mr. Kirwan to the temperature of 62°, was as follows:

Specific gravity.	
1.0039	wind at E.
1.0067	wind at W.
1.0118	storm at W.
1.0098	wind at N.W.

From which it appears that the proportion of salt in the Baltic when an east wind prevails is only $\frac{1}{108}$; and that this proportion is doubled by a westerly storm: a proof not only that the saltness of the Baltic is derived from the neighbouring ocean, but that storms have a much greater effect upon the waters of the ocean than has been supposed.

The Euxine and Caspian seas, if we believe Tournefort, are less salt than the ocean; but it is probable that the Mediterranean is at least as salt as the Atlantic.

The water of the Dead sea differs exceedingly from sea-water. Its specific gravity is 1.2403: and it is saturated with salt, containing no less than 24.4 per cent. of saline matter. According to the analysis of Lavoisier it is composed of

55.60	water
38.15	muriat of lime and of magnesia
0.25	common salt
100.000	

The water of this lake ought, therefore, to be distinguished from sea-water; and might with propriety be included among mineral waters.

The luminousness of the sea is a phænomenon that has been noticed by many nautical and philosophical writers. Mr. Boyle ascribes it to some cosmical law or custom of the terrestrial globe, or at least of the planetary vortex.

The Abbé Nollet was long of opinion, that the light of the sea proceeded from electricity; and others have had recourse to the same principle, and shown that the luminous points in the surface of the sea are produced merely by friction.

There are, however, two other hypotheses, which have more generally divided between them the solution of this phænomenon; the one of these ascribes it to the shining of luminous insects or animalcules, and the other to the light proceeding from the putrefaction of animal substances. The Abbé Nollet, who at first considered this luminousness as an electrical phænomenon, having had an opportunity of observing the circumstances of it, when he was at Venice in 1749, relinquished his former opinion, and concluded that it was occasioned either by the luminous aspect, or by some liquor or effluvia of an insect which he particularly describes, though he does not altogether exclude other causes, and especially the spawn or fry of fish. A similar conjecture is proposed by a correspondent of Dr. Franklin, in a letter read at the Royal Society in 1756; the writer of which apprehends, that this appearance may be caused by a great number of little animals, floating on the surface of the sea. And Mr. Forster, in his account of a voyage round the world with captain Cook, describes this phenomenon as a kind of blaze of the sea; and having attentively examined some of the shining water, expresses his conviction that the appearance was occasioned by innumerable minute animals of a round shape, moving through the water in all directions, which show separately as so many luminous sparks when taken up on the hand: he imagines that these small gelatinous luminous specks may be the young fry of certain species of some medusæ or blubber. And M. Dagelat and M. Rigaud observed several times, and in different parts of the ocean, such luminous appearances by vast masses of different animalcules; and a few days after, the sea was covered, near the coasts, with whole banks of small fish in innumerable multitudes, which they supposed had proceeded from the shining animalcules.

But M. le Roi, after giving much attention to this phænomenon, concludes, that it is not occasioned by any shining insects, especially as, after carefully examining with a microscope some of the luminous points, he found them to have no appearance of an animal; and he also found that the mixture of a little spirits of wine with water just drawn from the sea, would give the appearance of a great number of little sparks, which would continue visible longer than those in the ocean; the same effect was produced by all the acids, and various other liquors. M. le Roi is far from asserting that there are no luminous insects in the sea; for he allows that several gentlemen have found them; but he is satisfied that the sea is luminous chiefly on some other account, though he does not so much as offer a conjecture with respect to the true cause.

For farther observations on this subject, see the articles LUMINOUS SUBSTANCES and PHOSPHORESCENCE.

SEA-BUCKTHORN, in botany. See HIPPOPHAE.

SEA-CABBAGE, in botany. See CRAMBE.

SEA-DAFFODIL, in botany. See PANCRATIUM.

SEA-GRAPE, in botany. See CORCOLOBA.

SEA-LAUREL, in botany. See PHYLLANTHUS and XYLOPHYLLA.

SEA-LAVENDER, in botany. See STATICE.

SEA-PEA, in botany. See PISUM.

SEA-PIGEON PEA, in botany. See SOPHORA.

SEA-PINK, in botany. See CERASTIUM.

SEA-PURSLANE, in botany. See ATRIPLEX.

SEA-SIDE GRAPE, in botany. See CORCOLOBA.

SEA-HOLLY, in botany. See ERYNGEUM.

SEA-MOSS, in botany. See CORALLINA.

SEA-OAK, in botany. See QUERCUS MARINA.

SEA-ONION, in botany. See SCILLA.

SEA-CARNATION, in helminthology. See ACTINIA.

SEA-MARIGOLD, in helminthology. See ACTINIA.

SEA-STAR, in helminthology. See ASTERIAS.

SEA-HARE, in helminthology. See LAPLISIA.

SEA-DAISY, in helminthology. See ACTINIA.

SEA-MONSTER, in ichthyology. See CHIMÆRA.

SEA-FOX, in ichthyology. See SQUALUS.

SEA-CALF, in mastiology. See PHOCA.

SEA-EAR, in helminthology. See HALIOTIS.

SEA-PURSE, in helminthology. See ALCYONIUM.

SEA-FIG, in helminthology. See ALCYONIUM.

SEA-PEN, in helminthology. See PENNATULA.

SEA-HEDGEHOG, in helminthology. See ECHINUS.

SEA-URCHIN, in helminthology. See ECHINUS.

SEA-DOTTREL, in ornithology. See TRINGA.

SEA-PIE, in ornithology. See HÆMATOPUS.

SEA-SERPENT, in ichthyology. See MURÆNA.

SEA-FROTH, in mineralogy, a species of talc, more generally called keffekil. See TALCUM.

SEA-SALT. See SEA, and MURIAS SODÆ.

SEA-WATER. This is arranged amongst the simple saline waters. Its chemical analysis gives a proportion of 1 of saline contents to about 23½ of water; but on our shores it is not greater than 1 of salt to about 30 of water. Sea-water on the British coast may, therefore, be calculated to contain in the wine pint, of muriated soda 186,5 grains, of muriated magnesia 51, of selenite 6 grains; total 243½ grains, or half an ounce and 3½ grains of saline contents. The disorders for which the internal use of sea-water has been and may be resorted to, are in general the same for which all the simple saline waters may be used, as above. The peculiar power of sea-water and sea-salt as a discutient, employed either internally or externally in scrofulous habits, is well known, and is attended with considerable advantage when judiciously applied.

SEA-WRACK. See QUERCUS MARINA.

SEA is often used in composition, as will appear in the following examples.

SE'ABAR. *s.* (*hirundo piscis*, Latin.) The sea swallow.

SE'ABEAT. *a.* (*sea* and *beat.*) Dashed by the waves of the sea (*Pope*).

SE'ABOAT. *s.* (*sea* and *boat.*) Vessel capable to bear the sea (*Arbuthnot*).

SE'ABORN. *a.* (*sea* and *born.*) Born of the sea; produced by the sea (*Waller*).

SE'ABOY. *s.* (*sea* and *boy.*) Boy employed on shipboard (*Shakspeare*).

SE'ABREACH. *s.* (*sea* and *breach.*) Irruption of the sea by breaking the banks.

SE'ABREEZE. *s.* (*sea* and *breeze.*) Wind blowing from the sea (*Mortimer*).

SE'ABUILT. *a.* (*sea* and *built.*) Built for the sea (*Dryden*).

SE'ACAP. *s.* (*sea* and *cap.*) Cap made to be worn on shipboard (*Shakspeare*).

SE'ACHART. *s.* (*sea* and *chart.*) Map on which only the coasts are delineated.

SE'ACOAL. *s.* (*sea* and *coal.*) Coal so called, because brought to London by sea (*Bacon*).

SE'ACOAST. *s.* (*sea* and *coast.*) Shore; edge of the sea (*Mortimer*).

SE'ACOMPASS. *s.* (*sea* and *compass.*) The card and needle of mariners (*Camden*).

SEAFA'RER. *s.* (*sea* and *fare.*) A traveller by sea; a mariner (*Pope*).

SEAFA'RING. *a.* (*sea* and *fare.*) Travelling by sea (*Shakspeare*).

SE'AFENNEL. *s.* The same with SAMPHIRE.

SE'AFIGHT. *s.* (*sea* and *fight.*) Battle of ships; battle on the sea (*Arbuthnot*).

SEAFORD, a town in Sussex, and one of the Cinque Ports. Its forts are in a state of defence; but it has no market, and its trade and harbour are now of little consequence. It is seated near the English channel, 10 miles S.E. of Lewes, and 60 S. by E. of London.

SE'AFOWL. *s.* (*sea* and *fowl.*) A bird that lives at sea (*Broome*).

SE'AGIRT. *a.* (*sea* and *girt.*) Girded or encircled by the sea (*Milton*).

SE'AGREEN. *s.* (*sea* and *green.*) Resembling the colour of the distant sea; cerulean (*Pope*).

SEAL, in mastiology. See PHOCA.

SEAL (Solomon's). See CONVALLARIA.

SEAL. (*sigillum.*) A puncheon, or piece of metal, or other matter, usually either round or oval, whereon are engraven the arms, device, &c. of some prince, state, community, magistrate, or private person, often with a legend or inscription; the impression whereof in wax serves to make acts, instruments, &c. authentic.

The king's great seal, is that whereby all patents, commissions, warrants, &c. coming from the king are sealed: this consists of two impressions, one being the seal itself, with the effigies of the king stamped upon it; the other has an impression of the king's arms in the figure of a target, for matters of smaller moment, as certificates, &c. that are usually pleaded sub pede sigilli.

The keeping hereof is in the hands of the lord high chancellor, who is hence also denominated lord keeper.

This office of lord chancellor, or lord keeper, whose authority by 5 Eliz. c. 18. is declared to be exactly the same, is with us at this day created by the mere delivery of the king's great seal into his custody, without writ or patent.

The king's privy-seal is a seal usually first set to grants that are to pass the great seal. See PATENTS.

The use of seals is very ancient, an instance of which occurs in Daniel, chap. vi. 17. but seals are still older than this; for Jezebel, in 1 Kings, chap. xxi. seals the orders she sent for Naboth's death with the king's ring. See also Jerem. xxxii. 10, &c.

In effect, as the ancient seals were all engraven on the collets, stones, &c. of rings, and as the original use of rings, it is asserted, was only to be in readiness for the sealing of acts, instruments, &c. seals should seem as ancient as rings themselves.

These sealing rings, called *annuli signatorii*, *sigillares*, *cirographi* or *cerographi*, it is said in ancient authors, were first invented by the Lacedæmonians, who not content to shut their chests, armories, &c. with keys, added seals to them; and to this end, at first they made use of worm-eaten wood, the impressions whereof they took on wax, or soft earth; but they at length found the art of engraving figures, or rings, the impressions of which they took in the same manner. This, however, must be granted, that even in Moses's time, the art of engraving, not only on metals, but also on precious stones, was known.

Indeed, it does not appear, that the ring had any other use among the primitive Jews besides ornament: but at length it was used to seal instruments, contracts, diplomas, letters, &c. instances whereof we have in the first book of Kings xxi. 8. Esther viii. 10. Xenophon. Hellen. lib. I. Quint. Curt. lib. vi. Just. lib.

xliii. cap. iii. where we learn, the keeping of the emperor's seal was become a particular office; Lucian adds, that Alexander gave his seal to Perdiccas, thereby appointing him his successor.

Pliny observes, that in his time there were no seals used any where but in the Roman empire; at Rome he tells us, they were become of absolute necessity, insomuch that a testament was null without the testator's seal, and the seals of seven witnesses; but it does not appear that the Romans had any such things as public seals; nor that their edicts and contracts were sealed, not even in the times of the emperors.

In France the custom anciently was, instead of signing their instruments, &c. only to seal them; as appears from an infinity of ancient charters, which are not signed at all: the reason whereof was, that in those days very few people were able to write; scarce any body, indeed, could read and write but clerks; and the custom continued when learning made its way among them, though the reason for doing it had ceased.

In England, the first sealed charter we find extant is that of Edward the Confessor, upon his founding of Westminster abbey; yet, we read of seals in the MS. history of king Offa.

And sir Edward Coke relies on an instance of king Edwyn's making use of a seal about an hundred years before the Conquest; though some have doubted the authenticity of this charter; because it is certain that sealing was not then in common use.

Before the time of William the Conqueror, the English did not seal with wax, but only made a golden cross on the parchment, and sometimes an impression on a piece of lead, which hung to the grant with a silken string, and was deemed an abundant authorizing of the grant itself, without either signing or witnesses.

The colour of the wax wherewith William's grants were sealed was usually green, to signify that the act continued for ever fresh, and of force. The usual impression on all laymen's seals, till the year 1218, was a man on horseback, with a sword in his hand; afterwards, they began to engrave their coats of arms on their seals: only the archbishops and bishops, by a decree of cardinal Otto, who was legate here in 1237, were to bear in their seals their title, office, dignity, and even their proper names.

SEAL is also used for the wax or lead, and the impression thereon affixed to the thing sealed. An amalgam of mercury with gold, reduced to the consistency of butter by straining off part of the mercury through leather, has been recommended as a proper material for taking off the impression of seals in wax. In this state, the compound scarcely contains one part of mercury to two of gold; yet is of a silver whiteness, as if there was none of the precious metal in it. In this state it grows soft on being warmed or worked between the fingers; and is therefore proper for the purpose above mentioned, but is not superior to some amalgams made with the inferior metals, as is well known to some impostors, who have sold for this use amalgams of the base metals as curious preparations of gold.

To SEAL. *v. a.* (from the noun.) 1. To fasten with a seal (*Shakspeare*). 2. To confirm or attest by a seal (*Shakspeare*). 3. To confirm; to ratify; to settle (*Shakspeare*). 4. To shut; to close (*Bacon*). 5. To make fast (*Milton*). 6. To mark with a stamp (*Shakspeare*).

To SEAL. *v. n.* To fix a seal (*Shakspeare*).

SE'ALER. *s.* (from *seal.*) One that seals.

SEALER, an officer in chancery, appointed by the lord chancellor or keeper of the great seal to seal the writs and instruments there made in his presence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall with plaster, mortar, cement, lead, or other solid binding. For staples, hinges, and joints, plaster is very proper.

SEALING-WAX. See WAX.

SEAM. *s.* (ream, Sax. *zoom*, Dutch.) 1. The suture where the two edges of cloth are sewed together (*Addison*). 2. The juncture of planks in a ship (*Dryden*). 3. A cicatrix; a scar. 4. A measure; a vessel in which things are held; eight bushels of corn (*Ainsworth*). 5. SEAM *of Glass.* A quantity of glass weighing 120 pounds. 6. Tallow; grease; hog's lard (*Dryden*).

To SEAM. *v. a.* (from the noun.) 1. To join together by suture, or otherwise. 2. To mark; to scar with a long cicatrix (*Pope*).

SE'AMAID. *s.* (*sea* and *maid.*) Mermaid (*Shakspeare*).

SE'AMAN. *s.* (*sea* and *man.*) 1. A sailor; a navigator; a mariner (*Dryden*). 2. Merman; the male of the mermaid (*Locke*).

SEAMANSHIP, the art of working, or managing a ship. This necessarily includes the separate departments of tacking, veering, boxhauling, lying-to, heaving-to, reefing, scudding, steering, kedging, trimming the sails, chasing to windward, chasing to leeward, sailing against sea, coming to anchor, keeping a clear anchor, mooring, getting under way, setting, taking in, and bending sails, in blowing weather, &c. Also, the manœuvring a fleet with the order of sailing, of battle, of retreat, of bearing, &c. with the making of signals. These and other particulars comprehended under the general head of seamanship, it is obvious, cannot be discussed to any useful purpose in a single article; we, therefore, beg leave to refer to the works of Gorden, and Gower, with Falconer's well known Dictionary for the practice; and to Bouguer's Traité du Navire, and his Manœuvre des Vaisseaux, to Bernoulli, to Euler's Treatise on the Construction and Properties of Vessels (translated by colonel Watson), and to Don George Juan's Examen Maritimo, for the theory of this important branch of enquiry.

SE'AMARK. *s.* (*sea* and *mark.*) Point or conspicuous place distinguished at sea (*Bacon*).

SE'AMEW. *s.* (*sea* and *mew.*) A fowl that frequents the sea (*Pope*).

SE'AMONSTER. *s.* (*sea* and *monster.*) Strange animal of the sea (*Milton*).

SEA'MLESS. *a.* (from *seam.*) Having no seam.

SE'AMRENT. *s.* (*seam* and *rent.*) A separation of any thing where it is joined; a breach of the stitches.

SEAMS, or SEYMS, in the manage; clefts in the quarters of a horse, produced by the dryness of the foot, or by his being ridden on hard ground. They are the same thing as SANDCRACKS, which see.

SE'AMSTRESS. *s.* (ꝛeamerꝛne, Sax.) A woman whose trade is to sew (*Cleaveland*).

SE'AMY. *a.* (from *seam.*) Having a seam; showing the seam (*Shakspeare*).

SEAN. *s.* (ꝛegne, Sax.) A net; a seine.

SE'APIECE. *s.* (*sea* and *piece.*) A picture representing any thing at sea (*Addison*).

SE'APOOL. *s.* (*sea* and *pool.*) A lake of salt water (*Spenser*).

SE'APORT. *s.* (*sea* and *port.*) A harbour.

SEAR. *a.* (ꝛeapian, Sax. to dry.) Dry; not any longer green (*Shakspeare*).

To SEAR. *v. a.* (ꝛeapian, Sax.) To burn; to cauterize (*Rowe*).

To SEARCE. *v. a.* (*sasser*, Fr.) To sift finely (*Bayle*).

SEARCE. *s.* A sieve; a bolter.

SEA'RCER. *s.* (from *searce.*) He who searces.

To SEARCH. *v. a.* (*chercher*, Fr.) 1. To examine; to try; to explore; to look through (*Milton*). 2. To inquire; to seek for (*Milton*). 3. To probe as a chirurgeon (*Shakspeare*). 4. *To* SEARCH *out.* To find by seeking (*Watts*).

To SEARCH. *v. n.* 1. To make a search; to look for something (*Shakspeare*). 2. To make inquiry (*Milton*). 3. To seek; to try to find (*Locke*).

SEARCH. *s.* (from the verb.) 1. Inquiry by looking into every suspected place (*Milton*). 2. Examination (*Locke*). 3. Inquiry; act of seeking (*Addison*). 4. Quest; pursuit.

SEARCH-WARRANT, in law, a kind of general warrant issued by justices of peace, for searching all suspected places for stolen goods; and there is a precedent in Dalton, requiring the constable to search all such suspected places, as he and the party complaining shall think convenient; but such practice is condemned by lord Hale, Mr. Hawkins, and the best authorities.

SE'ARCHER. *s.* (from *search.*) 1. Examiner; trier (*Addison*). 2. Seeker; inquirer (*Prior*). 3. Officer in London appointed to examine the bodies of the dead, and report the cause of death (*Graunt*).

SE'ARCLOTH. *s.* (ꝛeꝛclaꝺ, Sax.) A plaster; a large plaster (*Mortimer*).

SE'ARISQUE. *s.* (*sea* and *risque.*) Hazard at sea (*Arbuthnot*).

SE'AROCKET. *s.* A plant (*Miller*).

SE'AROOM. *s.* (*sea* and *room.*) Open sea; spacious main (*Bacon*).

SE'AROVER. *s.* (*sea* and *rove.*) A pirate.

SEASE'RVICE. *s.* (*sea* and *service.*) Naval war (*Swift*).

SE'ASHARK. *s.* (*sea* and *shark.*) A ravenous sea fish.

SE'ASHELL. *s.* (*sea* and *shell.*) Shells found on the shore (*Mortimer*).

SE'ASHORE. *s.* (*sea* and *shore.*) The coast of the sea (*Dryden*).

SE'ASICK. *a.* (*sea* and *sick.*) Sick, as new voyagers on the sea (*Knolles*).

SE'ASIDE. *s.* (*sea* and *side.*) The edge of the sea (*Pope*).

SE'ASON. *s.* (*saison*, French.) 1. One of the four parts of the year, spring, summer, autumn, winter (*Addison*). 2. A time, as distinguished from others (*Shakspeare*). 3. A fit time; an opportune concurrence (*Philips*). 4. A time not very long (*Shakspeare*). 5. (from the verb.) That which gives a high relish (*Shakspeare*).

To SE'ASON. *v. a.* (*assaissonner*, Fr.) 1. To mix with food any thing that gives a high relish (*Brown*). 2. To give a relish to (*Tillotson*). 3. To qualify by admixture of another ingredient (*Shakspeare*). 4. To imbue; to tinge or taint (*Taylor*). 5. To fit for any use by time or habit; to mature (*Addison*).

To SE'ASON. *v. n.* To become mature; to grow fit for any purpose (*Moxon*).

SE'ASONABLE. *a.* (*saison*, Fr.) Opportune; happening or done at a proper time; proper as to time (*South*).

SE'ASONABLENESS. *s.* (from *seasonable.*) Opportuneness of time; propriety with regard to time (*Addison*).

SE'ASONABLY. *ad.* (from *seasonable.*) Properly, with respect to time (*Sprat*).

SE'ASONER. *s.* (from *to season.*) He who seasons or gives a relish to any thing.

SE'ASONING. *s.* (from *season.*) That which is added to any thing to give it a relish (*Arbuthnot*).

SEASU'RGEON. *s.* (*sea* and *surgeon.*) A chirurgeon employed on shipboard (*Wiseman*).

SEASURRO'UNDED. *a.* (*sea* and *surround.*) Encircled by the sea (*Pope*).

SEAT. *s.* (*sett*, old German.) 1. A chair, bench, or any thing on which one may sit (*Dryden*). 2. Chair of state; throne; post of authority; tribunal (*Hakewill*). 3. Mansion; residence; dwelling; abode (*Raleigh*). 4. Situation; site (*Raleigh*).

To SEAT. *v. a.* (from the noun.) 1. To place on seats; to cause to sit down (*Arbuthnot*). 2. To place in a post of authority, or place of distinction (*Milton*). 3. To fix in any particular place or situation; to settle (*Raleigh*). 4. To fix; to place firm (*Milton*).

SEATERM. *s.* A word of art used by seamen.

SEATON, a town of Scotland, in Haddingtonshire. Here is a ruinous palace, in which Mary queen of Scots occasionally kept her court, after her return from France. It has a considerable trade in salt and coal, and is situate on the frith of Forth, nine mile E. of Edinburgh.

SEAWARD. *ad.* Towards the sea.

SEBA (Albert), a native of Etzeel, in East Friezland, and the author of an immense work on natural history published at Amsterdam in 1734, in three vols. folio. The explanations are in Latin and French.

SEBACEOUS GLANDS. (*glandulæ sebaceæ*, from *sebum*, suet.) Glands which secrete a sebaceous or suetty humour.

SEBACIC ACID. Acid of fat. (*Fettsaure*, German.) When fat or any other kind of animal oil is exposed to a heat sufficient to volatilize it, it emits acrid fumes, among various other products, which early induced chemists to believe that an acid could be obtained from it. The subject was first treated of by M. Grutzmachen in a dissertation De Ossium Medulla in 1748, then by Rhades in 1753, next by Segner in 1754, and afterwards by Crell, who examined its properties very fully in two elaborate memoirs published in the Philosophical Transactions for 1780 and 1782. This pungent material, when condensed, was first denominated acid of fat, and afterwards, from the Latin term *sebum* (fat or tallow), sebacic acid. At this period however the characteristic properties of the different acids were not sufficiently known to enable chemists to distinguish the one from the other with precision. Thenard re-examined this subject in 1801, tried all the processes of Crell and Guyton Morveau, and found that the acids obtained by them were either acetic or the acid employed in the process; and that real sebacic acid had hitherto escaped their notice. He found that this peculiar acid was very distinctly given out during the distillation of tallow; and his experiments were repeated by Mr. Rose in 1804 with similar results, and a direct confirmation of the French chemist's experiments. The process by which Thenard obtained the sebacic acid is the following. He distilled a quantity of hogslard, and washed the product several times with hot water. He then dropped into it acetate of lead; there was formed a flakey precipitate, which was collected and dried, put into a retort with sulphuric acid, and heated. The liquor in the receiver had no acid character; but there appeared in the retort a melted matter analogous to fat. This is carefully separated; and after being washed, is boiled with water. By the action of heat the whole is dissolved by the water, and when it cools, crystals in the shape of needles are deposited. These are the sebacic acid, which has the following properties. It has no smell, a slight acid taste, and reddens strongly the tincture of turnsole. When heated it melts like tallow. It is much more soluble in warm than in cold water. Alcohol dissolves it in large quantities. Boiling water saturated with this acid forms a solid mass on cooling. It crystallizes in small needles, but with certain precautions may be obtained in the form of long, large, and very brilliant plates. It precipitates the acetat and nitrat of mercury and lead, and nitrat of silver; it neutralizes the alkalies, and forms with them soluble salts.

From the experiments of Mr. Rose we learn that the quantity of this acid produced from a given portion of fat is but very small: a pound of hog's lard yielding little more than forty grains, and tallow or suet still less.

There are various other ways by which this acid may be obtained; as by decomposing an animal alkaline soap by alum, and distilling the clear remaining residue with sulphuric acid; or, which, indeed, much resembles the last and was employed by Segner, previous to Crell's experiments, by saturating the distilled acid liquor with potash, and then decomposing it by distillation with half as much sulphuric acid as there was carbonat of potash employed. The same acid may also be prepared, according to Guyton, in the following way: mix any kind of animal fat with powdered quicklime, melt the mixture in an iron pot for a time, and when cold lixiviate the residue with warm water, which dissolves out the sebat of lime. Evaporate this liquor to dryness, by which a brown salt is left, which calcine in a crucible, then lixiviate and filter the solution, and evaporate to dryness. Lastly, decompose this calcareous salt by sulphuric acid, and the limpid pungent acid of fat will rise. The acids thus produced, however, are those obtained before Thenard's process, and which, as we have already observed, he considers as imperfect or mixt acids.

Every acid procured in any manner from animal fat is probably formed by the distillation or by the action of the sulphuric acid, and not merely evolved, since no change in the colour of litmus is produced by the contact of fat or of water employed to lixiviate it. That the action of heat or of sulphuric acid should produce acetous acid from materials which abound in its constituent parts may be readily conceived, and the history of the pyroligneous, lactic, and some other acids, show how readily the acetous acid undergoes particular modifications, by which its proper characters are disguised so as not easily to be detected.

SEBADILLA. See CEBADILLA.

SEBASTIAN, king of Portugal, was the posthumous son of the Infant John, by the daughter of the emperor Charles V. and succeeded John III. in 1557. He engaged in a war with the Moors in 1574, which, however, was attended with indifferent success. In 1578 he went to assist Muly Mohammed, son of Abdalla, king of Morocco, but in a great battle fought on the 4th of August that year, Sebastian was slain in the 25th year of his age. There were some pretenders who rose afterwards, and assumed to themselves the name of Sebastian, but they were discouraged.

SEBASTIAN (St.), a seaport of Spain, in Biscay, seated at the foot of a mountain, on the top of which is a strong citadel. The harbour is secured by two moles, and a narrow entrance for the ships. The town is surrounded by a double wall, and fortified toward the sea. It carries on a great trade, particularly in iron, steel, and wool. St. Sebastian was taken by

the French in 1794. It is 50 miles E. of Bilboa, and 50 N.W. of Pamplona. Lon. 1. 56 W. Lat 43. 24 N.

SEBASTIAN (St.), a town of New Spain, capital of the province of Chiametlan, 60 miles N.N.W. of Chiametlan. Lon. 105. 56 W. Lat. 24. 20 N.

SEBASTIAN (St.), the capital of the province of Rio Janeiro, and of all Brasil, with a citadel on a hill, and numerous forts. The city stands four miles W. of the harbour, and behind it are high hills crowned with woods, convents, houses, and churches. It is three miles in circumference; the streets straight and most of them narrow, intersecting each other at right angles; and the houses, in general, are of stone, and two stories high. The churches are very fine, and there is more religious parade in this city than in any of the popish countries in Europe. The harbour is very commodious, with a narrow entrance defended by two forts. Here are manufactures of sugar, rum, and cochineal. The different mechanics carry on their business in distinct parts of the town; particular streets being set apart for particular trades. On the S. side of a spacious square is the palace; and there are several other squares, in which are fountains, supplied with water by an aqueduct, of considerable length brought over a valley by a double tier of arches. The mint is one of the finest buildings existing, and furnished with all the conveniencies necessary for coining with the greatest expedition. A Benedictine convent and a fort are on the extreme point, jutting into the harbour, opposite which is Serpent island, where there are a dock-yard, magazines, and naval storehouses. In another part of the harbour, at a place called Val Longo, are the warehouses for the reception, and preparation for sale, of the slaves imported from Africa. St. Sebastian is a bishop's see, and at present the seat of the royal family of Portugal, who arrived here Jan. 8, 1808. It is seated near the mouth of the Rio Janeiro, in the Atlantic. Lon. 42. 44 W. Lat. 22. 54 S.

SEBASTIAN (Cape St.), a cape at the N.W. extremity of Madagascar. Lon. 46. 25 E. Lat. 12. 30 S.

SEBASTOPOL, a seaport of Russia, and the first maritime town of the Crimea. It has one of the finest and most secure harbours in the world, while for size it might contain all the Russian fleets; and it is the chief station of the Black sea fleet. The city is built on the side of a hill, which divides two of its fine basins. The old Tartar houses are small and ill built: but along the quay are some new buildings in a good taste. It stands on part of the site of the ancient Greek city of Cherson, where was the famous temple of Diana Taurica; and considerable ruins of them are yet discoverable. It is 40 miles S.S.W. of Sympheropol, and 350 N.E. of Constantinople. Lon. 33. 22 E. Lat. 44. 25 N.

SEBASTOPOLIS, or SAVATOPOLI, a town of Mingrelia, anciently called Dioscurias. It stands on the borders of Russia, on the Black sea, 220 miles W.N.W. of Tefflis. Lon. 42. 45 E. Lat. 44. 10 N.

SEBATS, in chemistry, salts formed by the union of sebacic acid with alkalies, earths or metals, as nitrats are those formed in like manner from nitric acid, and phosphats from phosphoric acid. These salts have hitherto only been examined with accuracy by Thenard, and are almost entirely unknown. The following is all we are acquainted with.

When the alkalies are saturated with sebacic acid, and the mixture is evaporated to dryness, redissolved, and concentrated, crystals are formed generally in plates and not deliquescent. These are all decomposable by sulphuric acid, and give out vapours, strongly smelling of acetous acid, but with a peculiar pungency. A similar salt is formed with lime, but with magnesia and alumina no crystals can be obtained. When sebacic acid is dropped into barytes water, lime water or strontian water, it does not render these liquids turbid; whence we learn that the sebats of the alkaline earths are soluble in water.

The alkaline sebats are likewise soluble.

Sebat of potash has little taste, does not attract moisture from the air; and when sulphuric, nitric, or muriatic acid is poured upon it, sebacic acid is deposited. When the concentrated solution of this salt is mixed with any of these acids, it becomes solid from the crystallization of the sebacic acid.

This acid has no action on silver or gold, but dissolves the oxyd of the latter metal. It acts on mercury when repeatedly abstracted from it, but dissolves the white carbonated oxyd with ease in the cold. This salt evaporated to dryness and heated, yields a mercurial sublimate in a very moderate temperature. Copper dissolves in this acid with ease, and yields small deliquescent crystals. Iron gives an astringent solution, and by evaporation leaves acicular crystals, scarcely deliquescent. Lead, antimony, zinc, and tin, are dissolved with more or less ease. See SEBACIC ACID.

SEBESTEN. (σεβεστον, an Egyptian word.) The dark black fruit of the cordia myxa; foliis ovatis, subra glabris; corymbis lateralibus; calycibus decemstriatis of Linnéus. It possesses glutinous and aperient qualities, and is exhibited in form of decoction in various diseases of the chest, hoarseness, cough, difficult respiration, &c.

SECALE. Rye. In botany, a genus of the class triandria, order digynia. Calyx opposite, two-valved, two-flowered, solitary. Four species, natives of Crete or the Archipelago, of which only one is cultivated in our own country, secale cereale, having glumes with a rugged fringe. It is sown in our fields, and distinguished into two varieties, winter and spring rye, from the different times of sowing them. This sort of grain succeeds very well in any kind of dry land, even on the most barren gravel. The winter rye is what the generality of farmers propagate: it is usually sown in au-

tumn, after a summer's fallow, in the driest time that can be had. Two bushels of seeds are allowed to an acre, but if the soil be ground newly broke up, or subject to worms, a peck more to the acre is generally allowed. A little sprinkling of dung or mud upon rye land will greatly advance the crop, though it is laid but half the thickness that it is for other corn. It is ripe when the straw is yellow, the ear bends, and the grain feels hard. It is not apt to shed the seeds; and, therefore, if there be many weeds among the crop, it may be left lying upon the ground eight or nine days after it is cut, before it is bound up, if the weeds be not dry sooner: for otherwise, the weeds will grow moist in the barn, and cause the whole to give, and not to thresh well, and sometimes they will make it musty. As it is a grain that will grow in the ear sooner than any other if it be wet, care must be taken, if rain fall (after it is cut), to turn it as it lies on the ground every other day; and at the same time to keep the ears as far from the earth, and as much above the stubble as may be. If it be pretty clear of weeds, it may be housed as soon as it is cut. If either this grain or wheat lodge upon the ground, it is best to cut them, even though they are not ripe; for the stalk being broken will yield no more nourishment to the ear.

For the rest, see the article HUSBANDRY.

SECANT, in geometry, a line which cuts another, whether right or curved.

SECANT, in trigonometry, is a right line drawn from the centre of a circle to meet the upper, or farther, extremity of any tangent, to the same circle.

An arch and its supplement have their secants equal, only the latter one is negative to the former, being drawn the contrary way. And thus the secants in the 2d and 3d quadrant are negative, while those in the 1st and 4th quadrants are positive.

The secant of an arc, which is the complement of the former arch, is called the cosecant, or the secant of its complement. The cosecants in the 1st and 2d quadrants are affirmative, but in the 3d and 4th negative.

The secant of an arc is reciprocally as the cosine, and the cosecant reciprocally as the sine; or the rectangle of the secant and cosine, and the rectangle of the cosecant and sine, are each equal to the square of the radius.

An arc a, to the radius r, being given, the secant s, and cosecant σ, and their logarithms, or the logarithmic secant and cosecant, may be expressed in infinite series, as follows, viz.

$$s = r + \frac{a^2}{2r} + \frac{5a^4}{24r^3} + \frac{61a^6}{720r^5} + \frac{277a^8}{8064r^7} \text{ \&c}$$

$$\sigma = \frac{r^2}{a} + \frac{a}{6} + \frac{7a^3}{360r^2} + \frac{31a^5}{15120r^4} + \frac{127a^7}{604800r^6} \text{ \&c.}$$

$$\log. s = m \times \left(\frac{a^2}{2} + \frac{a^4}{12} + \frac{a^6}{45} + \frac{17a^8}{2520} \text{ \&c.}\right)$$

$$\log. \sigma. = -\log. a + m \times \left(\frac{a^2}{6} + \frac{a^4}{180} + \frac{a^6}{2835} + \frac{a^8}{37800} \text{ \&c.}\right)$$

where m is the modulus of the system of logarithms.

If a be any arc, then

$$\text{sec. } 2a = \frac{\text{sec.}^2 a}{2 - \text{sec.}^2 a}$$

$$\text{sec. } 3a = \frac{\text{sec.}^3 a}{4 - 3\,\text{sec.}^2 a}$$

$$\text{sec. } 4a = \frac{\text{sec.}^4 a}{8 - 8\,\text{sec.}^2 a + \text{sec.}^4 a}$$

$$\text{sec. } \tfrac{1}{2} a = \sqrt{\frac{2\,\text{sec. } a}{1 + \text{sec. } a}}.$$

SECANTS (Figure of). See FIGURE.

To SECE'DE. *v. n.* (*secedo*, Latin.) To withdraw from fellowship in any affair.

SECE'DER. *s.* (from *secede*.) One who discovers his disapprobation of any proceedings, by withdrawing himself.

SECEDERS, a sect of presbyterians, who dissented from the established church of Scotland in the year 1733. The following circumstance gave rise to this sect. Messrs. Erskine, Wilson, Moncrieff, and Fisher, ministers of the church of Scotland, obstinately refused, for several years, to obey the decisions of the General Assembly with regard to the settlement of ministers agreeably to the law of patronage. For this open contempt of authority, the assembly, after many and repeated admonitions, were at last obliged to eject them from their respective charges. These four clergymen, when they saw matters carried this length, immediately complained of persecution; professed uncommon sanctity and austerity of manners; and cried out that the church was overrun with various errors, such as, a compliance with the law of patronage; the tenderness of the assembly to professors Simpson and Campbell, who were accused of Arian and Arminian heresies; and a number of practical deviations from the covenanted reformation of Scotland. They even inveighed against the conduct of the government for their ready admission of malignant and wicked men into places of trust in the army and state; for the loose and unlimited restoration of Charles II. to the throne; for the restoration of prelacy in England, which had been solemnly abjured: for restoring the superstitious Christmas vacance; for the repeal of the penal laws against witches, &c. &c. These things, joined to the popular talents of some of the above ministers, alarmed the minds of many well-meaning people, and in a few years procured a numerous train of followers. Elated with this unexpected success, they soon split into two parties. The chief point of contest among the leaders of this sect was concerning the lawfulness of what is called the burgess-oath; and hence the one party have ever since been called Burghers, and the other Anti-burghers.

To SECE'RN. *v. a.* (*secerno*, Latin.) To separate finer from grosser matter; to make the separation of substances in the body (*Bacon*).

SECE'SSION. *s.* (*secessio*, Latin.) 1. The act of departing (*Brown*). 2. The act of withdrawing from councils or actions.

SECHIUM, in botany, a genus of the class monoecia, order hexandria. Calyx half-five-cleft; corol five-cleft, with ten hollows in the upper part of the tube. Male: filaments five, cohering. Female: stigma peltate, five-cleft; pericarp fleshy, ovate-turbinate, one-seeded. One species only, sechium edule, the chocovine: a West-Indian plant climbing by tendrils like the cucumber tribe; leaves heart-angular, rugged above, with the angles toothed and acute. The fruit is boiled and served up at table like spinach; the root of the old vine is used as a yam, (dioscorea) and on being boiled has a farinaceous and not unpleasant taste.

SECKENDORF (Gui-Louis de), born at Hertzogen-Aurach, near Nuremberg, in 1626. He was privy counsellor to the elector of Brandenburg, and chancellor of the university of Hall. He wrote a great many books, the most esteemed of which is his Commentarius Historicus, et Apologeticus de Lutheranismo, sive de Reformatione Religionis ductu D. Martini Lutheri in magna Germania, &c. He died in 1692.

SECKER (Thomas), archbishop of Canterbury, was born at Sibthorpe, in Nottinghamshire, in 1693. He was bred a dissenter, but afterwards became reconciled to the church and its hierarchy. It is reported of him that his first master, Mr. Brown, of Chesterfield, put his hand on the head of his pupil and said, "Secker, if thou wouldst but come over to the church, I am sure thou wouldst be a bishop." In 1716 he began to apply himself to physic, and with the view to continue in it, he went to Paris to attend lectures; but making an acquaintance there with Mr. Benson, afterwards bishop of Gloucester, he was persuaded to take orders. To facilitate the obtaining a degree at Oxford he went in 1721 to Leyden, where he took that of M. D. and published his exercise, being a dissertation de Medicina Statica. He was ordained deacon, and afterwards priest, by bishop Talbot, to whom he became domestic chaplain. He took his degrees of B. and D. L. L. at the regular times, and in 1732 was made chaplain to the king. In 1735 he was made bishop of Bristol, from whence, in 1737, he was translated to Oxford. In 1758 he was raised to the archbishopric of Canterbury, which high station he adorned by his vigilance, liberality, and piety. He died in 1768. His works were published by his chaplains Dr. Stinton, and the late bishop of London.

SE'CLE. *s.* (*seculum*, Latin.) A century: not in use (*Hammond*).

To SECLU'DE. *v. a.* (*secludo*, Latin.) To confine from; to shut up apart; to exclude (*Ray*).

SE'COND. *a.* (*second*, Fr. *secundus*, Lat.) 1. The next in order to the first; the ordinal of two (*Dryden*). 2. Next in value or dignity; inferiour (*Addison*).

SE'COND-HAND. *s.* Possession received from the first possessor.

SECOND-HAND. *a.* Not original; not primary (*Swift*).

At SECOND-HAND. *ad.* In imitation; in the second place of order; by transmission; not primarily; not originally (*Swift*).

SE'COND. *s.* (*second*, French; from the adjective.) 1. One who accompanies another in a duel, to direct or defend him (*Drayton*). 2. One who supports or maintains; a supporter; a maintainer (*Wotton*). 3. *A* SECOND *Minute*, the second division of an hour by sixty; the sixtieth part of a minute (*Wilkins*).

SECOND. In music. An interval of a conjoint degree. There are four kinds. The diminished second, containing four commas; the minor second, consisting of five commas; the major second, consisting of nine commas, and the redundant second, composed of a whole tone and a minor semitone.

SECOND SIGHT, an odd qualification, which many of the inhabitants of the western islands of Scotland are said to be possessed of. The thing is attested by many credible authors (among whom is Mr. Martin, author of the natural history of these islands, and a member of the Royal Society;) and, notwithstanding the strangeness of it, many have stedfastly believed it.

The second sight is said to be a faculty of seeing things to come, or things done at a great distance, represented to the imagination as if actually visible and present.

Thus, if a man be dying, or about to die, his image, it is pretended, shall appear distinctly in its natural shape, in a shroud, with other funeral apparatus, to a second-sighted person, who, perhaps, never saw his face before: immediately after which, the person so seen certainly dies.

The quality of second sightedness, they say, is not hereditary; the person who has it cannot exert it at pleasure; nor can he prevent it, or communicate it to another; but it comes on him involuntarily, and exercises itself on him arbitrarily; and often, especially in the younger second seers, to their great trouble and terror.

There are a great number of circumstances said to attend these visions; by observation whereof, the particular circumstances, as to time, place, &c. of the death of the person, &c. are learnt. The method of judging of them, or interpreting them, grows into a kind of art; which is very different in different persons. Second sightedness is held a discredit in the country; so that none, they say, will counterfeit it; but that many conceal and dissemble it. See Johnson's Journey to the Western Islands of Scotland,

To SE'COND. *v. a.* (*seconder*, Fr. *secundo*, Latin.) 1. To support; to forward; to assist;

to come in after the act as a maintainer (*Sw.*). 2. To follow in the next place (*Raleigh*).

SE'CONDARILY. *ad.* (from *secondary.*) In the second degree; in the second order; not primarily; not originally (*Digby*).

SE'CONDARINESS. *s.* (from *secondary.*) The state of being secondary (*Norris*).

SE'CONDARY. *a.* (*secundarius*, Latin.) 1. Not primary; not of the first intention (*Bacon*). 2. Succeeding to the first; subordinate (*L'Estrange*). 3. Not of the first order or rate (*Bentley*). 4. Acting by transmission or deputation (*Prior*). 5. A *secondary* fever is that which arises after a crisis, or the discharge of some morbid matter, as after the declension of the smallpox or measles (*Quincy*).

SECONDARY, or SECUNDARY, an officer who acts as second or next to the chief officer. Such are the secondaries of the courts of king's bench and common pleas; the secondaries of the compters, who are next the sheriffs of London in each of the two compters; two secondaries of the pipe; secondaries to the remembrancers, &c.

SECONDARY *circles of the ecliptic* are circles of longitude of the stars; or circles which, passing through the poles of the ecliptic, are at right angles to the ecliptic. See CIRCLES OF LATITUDE.

By the help of these all points in the heavens are referred to the ecliptic; that is, any star, planet, or other phænomenon, is understood to be in that point of the ecliptic, which is cut by the secondary semicircle, which passes through such star, or phænomenon.

If two stars be thus referred to the same point of the ecliptic, they are said to be in conjunction; if in opposite points, they are said to be in opposition; if they be referred to two points at a quadrant's distance, they are said to be in a quartile aspect; if the points differ a sixth part of the ecliptic, they are said to be in sextile aspect.

SE'CONDLY. *ad.* (from *second.*) In the second place (*Swift*).

SE'COND-RATE. *s.* (*second* and *rate.*) 1. The second order in dignity or value (*Addison*). 2. (It is sometimes used adjectively.) Of the second order (*Dryden*).

SE'CRECY. *s.* (from *secret.*) 1. Privacy; state of being hidden (*Shakspeare*). 2. Solitude; retirement (*South*). 3. Forbearance of discovery (*Hooker*). 4. Fidelity to a secret; taciturnity inviolate; close silence (*Shaksp.*).

SE'CRET. *a.* (*secret*, Fr. *secretus*, Latin.) 1. Kept hidden; not revealed; concealed (*Deuteronomy*). 2. Retired; private; unseen (*Milton*). 3. Faithful to a secret intrusted (*Shakspeare*). 4. Private; affording privacy (*Milton*). 5. Occult; not apparent (*Milton*). 6. Privy; obscene.

SE'CRET. *s.* (*secret*, Fr. *secretum*, Latin.) 1. Something studiously hidden (*Shakspeare*). 2. A thing unknown; something not yet discovered (*Milton*). 3. Privacy; secrecy; invisible or undiscovered state (*Milton*).

To SE'CRET. *v. a.* (from the noun.) To keep private (*Bacon*).

SE'CRETARISHIP. *s.* (*secretarie*, Fr. from *secretary.*) The office of a secretary.

SECRETARY, an officer who by his master's orders writes letters, dispatches, and other instruments, which he renders authentic by his signet. Of these there are several kinds; as, 1. Secretaries of State, who are officers that have under their management and direction the most important affairs of the kingdom, and are obliged constantly to attend on the king: they receive and dispatch whatever comes to their hands, either from the crown, the church, the army, private grants, pardons, dispensations, &c. as likewise petitions to the sovereign, which, when read, are returned to them; all which they dispatch according to the king's direction. They have authority to commit persons for treason and other offences against the state, as conservators of the peace, at common law, or as justices of the peace throughout the kingdom. They are members of the privy council, which is seldom or never held without one of them being present; and as to the business and correspondence in all parts of this kingdom, it is managed by either of the secretaries, without any distinction; but with respect to foreign affairs the business is divided into two provinces or departments, the southern and the northern, comprehending all the kingdoms and states that have any intercourse with Great Britain; each secretary receiving all letters and addresses from, and making all dispatches to, the several princes and states comprehended in his province. 2. Secretary of an Embassy, a person attending an ambassador for writing dispatches relating to the negociation. There is a great difference between the secretary of an embassy, and the ambassador's secretary; the last being a domestic or menial of the ambassador, and the first a servant or minister of the prince. 3. The Secretary of War, an officer of the War Office, who has two chief clerks under him, the last of which is the secretary's messenger. There are also secretaries in most of the other offices.

To SECRE'TE. *v. a.* (*secretus*, Latin.) 1. To put aside; to hide. 2. (In the animal economy.) To secern; to separate.

SECRETION. (*secretio.*) A function by which different organs separate from the blood substances destined for particular uses; as, the bile in the liver, saliva in the mouth, &c.

The fluids which, being deposited from the blood into other vessels, are said to be secreted, seem reducible to four classes. The first consists of viscid fluids, coagulable by a heat of about 150 degrees, by alkohol, and by strong acids; although generally, in the living animal, they escape in the form of vapour, and after death are compacted into a gelatinous substance. To this class belong the liquor and halitus of the ventricles of the brain, of the pericardium, pleura, peritoneum, tunica vaginalis, amnios, joints, renal capsules, and probably of the womb, with the juices of the stomach and intestines, and lastly the lymph of the body.

The second class consists of fluids, of which some, in like manner, are exhaled, but more simple than the former, and more aqueous, are not coagulable by fire or by spirits of wine an

others are not exhaled, but being deposited in their respective excretory ducts, are excreted in their proper places by the common outlet of some gland. To the former of this class belong the perspirable matter of the skin, part of the tears, and the watery humour of the eye. To the latter of this class belong the remaining part of the tears, the saliva, pancreatic juice, and the urine. The sweat seems to be a mixture of the perspirable matter and the subcutaneous oil.

The third class differs from both the preceding, being heavier than water, sluggish and viscid, but of an aqueous nature, not congealable into a jelly, but hardening into dry crusts by exhaling their water. These do not effervesce with any salt, but are contracted and made thicker by acids. By lixivial salts they are dissolved. By fire they are resolved into water, a little volatile salt, and a little oil. Of this kind are the whole mucus in the human body, extending over all the internal passages for air, aliments, or urine, and the cavities of the genital parts; and semen.

The last class is that of the inflammable juices, which, when recent, are indeed thin and watery, but, by stagnation and by evaporating their water, become thick, oily, inflammable, and often bitter liniments. To this class we refer the bile, ear-wax, tallow, the oily liniment of the skin, the marrow in the bones, and all the fat throughout the human body; and castor, and the yolk of the egg. The milk itself, so far as it contains butter, belongs to this class.

Other humours are compounded of these which we have described as simple: as the milk, of butter and water; and the liniments of the joints, of lymph and fat.

Whoever considers, that in the blood are found a coagulable serum, an exhaling water, a sort of viscid mucus, and lastly an oil, will begin to perceive the perfect possibility of the foregoing classes of humours being separated from the blood, since their principles exist in the sanguineous mass. But in what manner it is brought about, that oil is separated from the blood in one part, water in another, and mucus in a third, remains to be explained, and requires a description of the secretory organs.

The coagulable juices are separated almost every where, from the arteries themselves, into excretory canals, continuous with the arteries, without any intermediate organ. The proof of this we have from injections of glue, water, and thin oils, which very readily exude from the red arteries, and are poured out into all the cavities in which that coagulable vapour is naturally found, without meeting with any intermediate knots or retarding cells. Finally, the blood itself, being poured out into most of these cavities, without any permanent lesion, in consequence of stagnation, retardation, or small increase of impetus, shows plainly that the passage betwixt the red blood-vessels and those excretory ducts is neither long nor difficult, and that the yellow serum does not differ much from blood.

Another liquid, coagulable by acid spirits and alkohol, is the albuminous humour of the joints, which being composed of fat, medullary oil, and watery exhalation, constitutes an exceedingly soft liniment, very fit for lubricating the cartilages, and lessening friction. For secreting this there is a particular arrangement of small arteries, which are so situated in the rough pits of the articulations of the bones, that they may be moderately compressed, but cannot be crushed.

The structure of these glands, as they are called, is peculiar. The larger clusters adhere, for the most part, to the bone by a broad basis wrapped up in fat. Thence, being extenuated into a crested edge, they pour out their liquor from an exceedingly thin border, by open ducts, which however are not very evident. Other smaller ones, placed every where in the capsules of the tendons, and between the diverging fibres of the ligamentary capsules of the joints, seem to be almost of the nature of simple glands, and are turgid with yellow mucous serum.

The uncoagulable juices of the first sort are secreted in the same manner with the coagulable ones; to wit, from exhaling arteries, which arise from the red arteries, without any intermediate follicle. In the vessels, which exhale the cutaneous perspiration, and in the lachrymal vessels of the first sort having a watery fluid; injections of water, or thin size, exude from the arteries, so as to remove every doubt of this. These arteries are also irritable, so that, from the contact of an acrid substance, they discharge more juice in a given time, than in a state of health.

But in the latter kind, the salival, the secretion is made by means of conglomerate glands, which the ancients first distinguished by their cluster-like fabric, and esteemed glands. These are composed of acini or roundish lobules, conjoined together into a larger mass, by loose cellular substance, which is often covered externally by some dense cellular membrane, as a common envelope, as in the parotid and maxillary glands. Through the intervals, betwixt the clusters, run the arteries, which are here pretty large, and the veins. But most of the conglomerate glands separate their fluids from the blood, and discharge it in the following manner: each acinus sends out an excretory duct, which joins with others of the same kind, into a larger trunk, forming at last, in the manner of veins, one canal, which conveys the humour, separated by the gland, to the part for which it is designed, as the cavity of the mouth, intestines, surface of the eyes, &c. There are, indeed, some instances, in which either there are no excretory ducts, or they have not hitherto been discovered; as the thyroid gland, capsulæ renales, and thymus, unless these approach to the nature of conglobate glands.

The acini themselves are surrounded and limited by some firm cellular substance; and are also subdivided into lesser acinuli, as is evident to the eye, and by the microscope. How does this subdivision end? Is every simple acinus hollow in its middle, receiving the humour transuding from the arteries in a follicle, and sending it out by an excretory duct? Is this structure rendered probable by eruptions, hydatids, and the kidneys filled with round scirrhi? Are the larger viscera, appointed for secretion, conglomerated glands? Is this opinion made probable from the morbid round concretions formed in the liver, spleen, kidneys, testicles, and cortical substance of the brain; or from the bunch-like appearance which those viscera have in smaller animals? In the cellular substance that surrounds every part of the human body, even the extreme vessels, are there hollow spaces and cells, into which a secreted humour is poured?

Nothing of this kind seems to be the case. For, indeed, the acini composing the viscera of animals, are not elementary, but compounded, and large in proportion to the animals. The morbid concretions are almost all of them seated in the cellular

substance, and in the limbs themselves, where there is not the least room to suspect any thing of a glandular fabric; and are composed of oil, earth, and vaporous particles, extravasated into some of the cellular cavities, where, stagnating and compressing the adjacent follicles, they form to themselves proper membranous tunics. Besides, the watery and fluid nature of the juice secreted in these glands is an argument that, during its secretion, it met with no retardation, no place in which it stagnated. For the fluids which remain at rest in the warm cavities of the human body, which are full of absorbing vessels, are all inspissated, and approach either towards a mucous or an oily nature. Moreover, anatomical injections would meet with more difficulty in passing from the arteries into the excretory ducts; which would be impervious to thick injections, and thin ones would be exhaled into the cellular substance. Yet we see, that the superlative art of great anatomists has conveyed thick injections, like wax, directly from the arteries of the salivary glands, liver, &c. into continuous excretory ducts; and this without filling up any intermediate cavities, which, according to the foregoing hypothesis, should happen.

Therefore, the acini appear to be composed of arteries and veins, divided and subdivided, parted and connected by the intervention of a good deal of cellular substance, which, becoming gradually more compact, assumes a spheroidal figure. This is supported, by analogy, in the lobes of the lungs, in the lobules of the thymus, in the structure of insects; but more especially in the testicle, of which the lobules are evidently formed of excretory ducts, connected together into fasciculi by a very soft membrane. The glands do not seem to pour their fluids into cellular substance, as by it the passage to the excretory ducts would be obstructed or prevented. The industry of anatomists has lately discovered very small, white, cylindric vessels, the real elements of the viscera; and it is to be hoped that this discovery will be confirmed by future observations.

Thin fluids, neither coagulable nor exhaling, but aqueous, are likewise generated in other parts, without the assistance of conglomerate acinous glands. Thus, the urine is deposited from the red arteries into membranous tubes, manifestly continuous, in a manner which readily admits the passage of air, water, or mercury. The nervous fluid seems to be secreted in the brain, in a similar, though less apparent, manner.

The third class of fluids, the mucous, is almost every where secreted from sinuses or hollow glands. The structure of true glands or follicles, in general, consists of an ample cavity, every where circumscribed by a membrane; but in such a manner, that the flesh itself of the part, to which the gland adheres, sometimes forms the one side, and completes the hemisphere of the follicle. In other places, a continued membrane forms the whole of the round or oval receptacle of the gland. The cavity is in general round; but sometimes it is oblong, and situated obliquely betwixt the adjacent parts; as, for example, in the urethra of the male, and in the follicles of the sinus muliebris. They are irritable; and, when stimulated by acrid substances, accelerate their secretions.

Into these follicles, minute arteries, either from the flesh in which it is seated, or from the membrane which constitutes its convex side, open by extremities extended into the cavity of each crypta, into which they pour their respective juice; after being received into the follicle, it is detained from the narrowness of the excretory duct, and inspissated, the more watery parts being absorbed by the veins, which correspond to the exhaling arteries. The truth of this we are taught from the structure of the simple follicles observable in the tongue, in which both the importing pores, and the excretory ducts, are even visible to the eye; and from the tubuli of the stomach of birds, in which the secreting villi manifestly protrude into the cavity; and lastly, from injections, which force wax colourless into the simple glands.

The long mucous sinuses, and round glands, are both furnished with excretory ducts, which, for the most part, are sufficiently large; although, in the round glands, they bear no great proportion to the cavity of the gland. These orifices often open into the common large cavity, into which the mucus is poured, without any intermediate duct; as in the back of the tongue, and in the simple glands of the stomach and intestines. These have been denominated cryptæ by Ruysch. The sinuses have often a similar structure, and open, without an intervening duct, as in the urethra of the male.

In another kind of these glands, there are many simple follicles contained in one common covering, which open with ample orifices into one common sinus, without any true excretory duct, as in the tonsils.—These are called conglomerate glands.

Other simple glands have an excretory duct, by which they excrete their mucus; namely, a membranous, cylindric, narrow vessel, opening with its posterior orifice into the cavity of the gland, and with its anterior orifice into the common cavity for which its mucus is designed. These excretory ducts are of considerable length in the subcutaneous and sebaceous glands, and in those of the palate and wind-pipe. In some parts, the pore and duct are more easily demonstrable than the follicle, as in the nostrils, larynx, rectum, &c.

In other places, several of these ducts, arising each from its respective follicle, run together like the branches of a vein, so as to form one considerable excretory canal, common to a number of follicles. To this kind belong the compound glands of the intestines, and the blind sinus at the root of the tongue, of the class of glands: and of the sinuses, some compound sinuses of the urethra, and the tubulous fibres of the stomachs of fishes and of birds. Glands of this sort may be said to be compounded of simple ones; but where they lie only contiguous, they may be called aggregate or congregated glands; as are those of the fauces, stomach, intestines, &c.

The inflammable juices are separated by organs differing in their fabric. The fat and marrow are deposited into cellular substance, without the intervention of glands, from the small mouths of the arteries. The subcutaneous fat every where exudes through small ducts and pores, without any glandular follicles. But the ear-wax and cutaneous suet are secreted by glands of different kinds. Many of the sebaceous glands are visible with a naked mouth in the skin, and without a duct of any length; as we see in the ears, areolæ of the nipples, in the female nymphæ, and the groove betwixt them and the labia, and in the prepuce of the penis and clitoris. These differ but little from the cryptæ, except in the matter which they secrete.

There are others of the sebaceous glands, which have an excretory duct of some length; as almost all the cutaneous ones, which being seated in the cellular substance, are necessarily provided with

a duct to perforate the skin. This is most evident in the face, where the length of the duct is indicated by the maggot-like substance pressed out; the bulk of which demonstrates, that a follicle lies under the slender pore.

There are still other sebaceous glands of the kind, in which the small ducts of many cryptæ meet together in one larger excretory duct. Thus, in the face, in several places, the large pores are in common to a number of cryptæ. Of this kind, also, are those sebaceous ducts in the eye-lids: and the unguinous glands in the secretory organ of the musk-goat, beaver, hyæna, civet-cat, and musk-rat, which pour their sebaceous matter into one common receptacle.

The milk, which is composed of water and oil, and perhaps of absorbed fat, and is a fluid of a peculiar nature, is secreted in a conglomerate gland. The bile is a matter of controversy; but there are many arguments in favour of the vascular structure, and of the bile being deposited in the pori biliarii, from the vena portarum, without intermediate follicles; especially the Ruyschian art of injection, in which the wax passes directly from the porta into the biliary pores, without meeting with any intermediate knots retarding it. The milk and bile are both of them, however, much thinner, and more watery, than the fat, or the sebaceous matter in follicles.

It remains for us to inquire, how it happens, that from one common mass of the blood, the same variety of peculiar fluids are constantly separated, each in its respective place, and that milk is never secreted in the kidneys, bile in the thymus, or mucus in the sebaceous glands. This problem will be at last perfectly solved by one who shall be intimately acquainted with the internal structure of the secreting organs. In the mean time, what is hitherto known with sufficient certainty shall be noticed.

In the first place, the blood itself, from which any liquid is to be secreted, assumes, in various places, that peculiarity of character, that it contains more particles, of a like nature with those which nature wishes to predominate in the fluid to be secreted. In the liver, the venous blood arrives with a slow motion, loaded with oil, and the semi-putrid vapours of the intestines. To the testicles, the blood is brought slowly through long slender and inflected canals, arising at very small angles, under the skin, in a cold situation. In the carotids, it is probable that the stronger, spirituous, and dense parts of the blood ascend; so that that is more watery which descends into the abdomen and to the kidneys, and forms the saliva of the pancreas, and the gastric and intestinal juices.

Besides, the blood is prepared for secretion, by its retardation in the minute vessels, in consequence of which, the red and denser parts alone occupy the axis of the canal: while the other lighter, more sluggish, and less quickly moved particles, recede to the lateral branches, impinge on the secretory mouths arising from the sides of the vessels, and adhere to them by their viscosity.

These orifices, though possibly of different diameters, are always too small to admit the blood in their natural state. As from an increased action of the heart, many of them admit blood, we may conclude, with probability, that they arise continuous with the red arteries, and are not much smaller than the red globules. Hence the same secretory orifices refuse thick injections of wax or suet, and generally admit thinner liquors injected into the arteries. Therefore, this is the first and most simple mechanism of secretion, viz. that the caliber of the excretory duct admits only those particles, of which the greater diameter is less than the diameter of the duct. It is only in this way that the yellow arteries convey a pure liquor from the blood, and that the uriniferous ducts exclude the red blood and coagulable serum. But this is not the sole cause, since similar fluids are generated by large, as well as by small animals.

Merely according to this law, the secreted juices may be of many different kinds: for the very minute orifices will only admit fluids of extreme tenuity, as in the small vessels of the brain; while the larger will admit water and jelly; and the largest of all fat. Moreover, if a number of secretory organs arise, in succession, from one secerning artery, and be provided with large orifices, those which arise last from the artery will admit only the thinnest fluids. If, on the contrary, those which arise first in order from the secreting artery, be small, the last ones will receive only the grosser liquids. It may be objected, that though the vessels in the fœtus are vastly less than in an adult, yet the humours are the same. But these humours, which are called fat, bile, lymph, and urine, in the fœtus, are very different from the fat, bile, lymph, and urine of an adult.

It is altogether in this way, that most secretions are made by vessels arising immediately from sanguiferous arteries. These separate gross juices; thick, coagulable, or watery; as the fat, urine, juice of the stomach and intestines, &c. But other secretions of thinner juices are performed by vessels arising from the inferior orders of arteries, not sanguiferous; to the orifices of which not only no red blood, but no serum, fat, or other gross fluids, can have admittance. Thus the more thin and pure humours must necessarily be separated; as, for example, in the eye.

Perhaps the angle, which the secretory branch forms with its trunk, contributes something to secretion. For it is easily demonstrated, that at right and reflected angles, only the viscid and sluggish juices are expelled, in consequence of the stronger force of the particles keeping the middle of the canal; and that the liquids which preserve their velocity, are those sent off at acute angles. For men of credit have observed, that, in living animals, the velocity is greater in acute angles, and less in right angles. The very structure of the body convinces us, that these angles have some effect on secretion, since in different parts we find the angles at which the branches proceed from the trunks different, and the reticulations different. For the ultimate vessels are, in general, arbuscular, the trunks sending out branches on every side, but at different angles; thus, at small angles in the large intestines, and large angles in the small intestines. Thus, in the spleen, the smaller red arteries arise so thick from their trunks, that they resemble a sprinkler; in the intestines, they resemble pencil-brushes; in the kidneys they are serpentine; in the liver radiated; in the testicle, they are curled up like a lock of hair; and in the uvea they are anular. But it is no improbable conjecture, that the Creator never made this diversity of fabric in vain. We have not as yet, however, any account of these reticulations that is sufficiently accurate; nor does a similarity in the fluids secreted seem to be connected with a similarity of structure. The veins tôo have similar reticulations, for the purpose of facilitating the motion of the blood, and not for diversifying the nature of the secretions.

The inflexions of the smaller vessels, as well arteries as excretories, greatly retard the motion of the blood; in which the greater part of the force received from the heart is evidently spent in the change of figure in the vessel. The repeated inflexions, therefore, of the secretory arteries collect the viscid parts of the fluids, by giving them time to attract each other. A straight course of the vessels is favourable to celerity of motion, rendering the secretion copious and easy, but impure, as we see in the urine.

That the ultimate arteries, and in like manner the secretory orifices, have different degrees of density, is not improbable, since we actually find it so by experiments in the larger branches. But the denser the capillary arteries are, the more will they admit only the strong, and at the same time minute particles, and exclude those that are lighter, moved with less velocity, and grosser. Irritability produces almost the same effects; for if the secretory orifice be irritated, it will reject the gross humours, and transmit the more fluid ones: instead of mucus in the urethra, it will separate a thin yellow serum; and a similar fluid, instead of the subcutaneous fat; the quantity of secreted liquor will also be increased; as, for example, in the tears.

Lastly, the velocity is greatly increased, if the heart be near, if the artery be straight, if it go off at a small angle, or if the excretory duct arise near the extremity of a considerable arterial branch. The velocity is diminished, if the secreting artery run a long way capillary, losing the greater part of the motion of its blood, from friction, if it arise at a distance from the heart, and at a large angle. Finally, from whatever cause the diversity may proceed, an increase of velocity increases the quantity of fluid secreted, carries off the heavy liquids, and renders the secretions thicker and more impure, though fluid, as it prevents stagnation, by which they contract viscidity: but slowness facilitates attraction and viscidity, and renders the secreted juice more pure; as the similar particles, when brought together, can better attract and join each other under a slow motion, so as to retain the larger canal, while the thinner parts go off by the lesser lateral branches. Hence, from the impetus of the heart alone being too much increased, all the secretions become confounded.

These conditions nature is able variously to unite or separate, and to impart to each organ, in greater or less degrees; and thus, to modify the secreted humours in various ways. Anatomy furnishes examples, if you compare the secreting apparatus of the bile or semen, which are thick juices, with those of the urine and tears, which are fluid ones.

From all that has been advanced, we may perceive, that, since the blood contains particles of various kinds; some sluggish and mucous; some coagulable, but fluid; some dense and red; some watery and thin; and others fat and viscid: among all these particles, those which are the largest and most dense, such as the cruor, will continue in the axis of the vessel, and in the trunk, so as to pass on in a continued course into the sanguiferous vein.

Those particles which are gross and sluggish, such as the fat, must go off by the larger orifices arising laterally from the sanguineous artery, by short ducts; for in long ducts the oil would stagnate, from its sluggishness. The phenomena of the secretion of fat agree with this description. Such as are coagulable, but specifically heavier than those which are merely watery, and which continue fluid in the living animal, pass from the red arteries into others which are pellucid, but continuous to the red ones, and smaller; whether these pellucid ones be continued on as trunks, sending off other smaller branches, such as the arteries of the inferior orders; or whether they exhale their contents by a short extremity.

Thin watery fluids may evidently pass off by any vessels continuous with the sanguiferous, or inferior orders of vessels, provided they be only small enough to exclude the grosser juices: whether these proceed from the sides of the larger vessels, or whether all the proper fluids being sent off through the larger canals, the smaller canal be continued as the trunk, as in the eye. To the production of these fluids, the most simple fabric, even the direct continuation of the secretory artery itself into the excretory duct, is sufficient, as seems probable in the urine. Therefore, in this case, the structure is direct and simple, with few inflexions, and with little diminution of velocity.

Such juices as being watery, are light, but viscid at the same time, and consequently sluggish and tardy, escape easily by short tubes appended to the sanguiferous arteries, and less than the adipose vessels; and, therefore, it is evident, that these will be separated from the blood more abundantly in some parts of the body, where the velocity derived from the heart is less, the flexures of the artery more frequent, and the length of the capillaries greater.

Has each part its particular ferments, form of pores, specific weight, and filters filled with their own peculiar humour, and refusing whatever is not analogous to it, which determine the nature of the fluids to be generated? Let those who adopt these ideas, consider the great varieties there are in fluids, separated in the same part of the body, according to the difference of age, course of life, &c. In the fetus, the bile is sweet; the semen thin, and without animalcules; the milk watery or absent; the urine watery, mucous, and insipid; the uterine mucus very white; the cutaneous vessels full of a red fluid; the aqueous humour red; and the fat gelatinous. In the same organs, in an adult person, the bile secreted is acrid; the semen thick; the milk butyraceous; the urine yellow, thin, and alkalescent; the menstrual blood, and the aqueous humour, very limpid. But, even in the adult person, how different the aqueous humour, the concocted urine, and the heavy febrile urine, replete with salts and oils! The passions of the mind, which make no change in the body except upon the tension of the nerves, yet wonderfully change the secretions, and expel even the blood and bile through the vessels of the skin. Add to this, the frequent disturbance and alteration of the secretions from slight causes; so that, different augmentations of velocity shall cause different liquors to be secreted by the same organ; for blood has been known to pass into almost all the passages of all the fluids; of the sweat, tears, mucus of the nostrils, and of the womb, milk, semen, urine, and fat. A true milk has been seen separated by glands in the thigh. When the urine is not excreted, on account of some defect of the kidney, ureters, or bladder, it has been exhaled into the skin, ventricles of the brain, or into the whole cellular fabric. The perspirable matter of Sanctorius, though so fluid, by cold is sent off by the urinary passages; and by fear, or by medicines,

through the excretory villi of the intestines. That exhaling viscid matter of the cellular substance is secreted and absorbed, and by the same organs, alternately with the fat, so different from it. Salivation supplies the place of the exhaling fluid of Sanctorius; the exhaling fluid supplies the internal. The bile, when absorbed, evidently passes into the vessels of the eyes. It appears, that there is not any thing in the particular fabric of any of the viscera or glands, that can so fix or maintain the nature of the secreted fluid; that in perfectly entire organs, different fluids may not be separated, by an increase or diminution of velocity, or alteration of the structure of the nerves. The specific gravities of the viscera and strainers do not correspond to the specific gravity of the humours which they secrete; nor are they at all known by experiments that can be depended on.

It now remains for us to discover how the pure secretions are formed in a healthy person. For all the fluids, when recently secreted, without excepting any, not even the oil, are mixed with a great deal of water; nor does it seem possible that any of the thicker juices could be formed, without having a mixture of the thinner ones: how then do the semen, bile, oil, and mucus, get rid of their superabundant water, and acquire their proper viscidity and other qualities?

For this end, nature has framed glands and follicles, large and small, for those fluids from which the watery parts are to be separated, in order to render the remaining part more strong and viscid. A slightly mucous water, differing at first very little from the perspirable vapour or from tears, is deposited in the follicles of the nostrils, wind-pipe, and intestines. This is not continually discharging, because the excretory orifice being less than the follicle, and the excretory duct being sometimes long and slender, at others repeatedly bent, and inflected or transmitted through hard cellular texture, or closed by some force equivalent to a sphincter, the fluid is so retarded that it can scarcely escape without the assistance of extrinsic pressure; unless perhaps the follicle being irritated by its quantity or acrimony, press out the liquor incommoding it, by a kind of peristaltic motion. This appears from the morning discharges of mucus by blowing the nose, coughing up from the lungs, and by sneezing after the nocturnal stagnation. In the mean time, the patulent veins, extended into the cavity of the follicle, absorb the more aqueous parts from the thin mucus, so that it becomes thicker as it is retained longer; but if, by the force of some stimulus, it be directly discharged after it is secreted, it comes out thin and watery. Examples of this we have in the urethra, in the nostrils, and in the ear-wax; as also in the bile, which, at its first separation in the liver, is watery, and has but little yellowness or bitterness. It is therefore detained in a bladder, and there digested by the vital heat; its thinner parts are absorbed by the veins, or exude through the membranes themselves; whence the remainder becomes more thick, bitter, and oily. The same mechanism takes place in the semen; which, being preserved in the seminal vesicle, is there thickened, so as to be very viscid after long chastity; while after repeated venery it is expelled very fluid. In some places nature has made this receptacle double or triple in the same organ, that the fluid might attain the utmost degree of viscidity. In the seminal passages, the rete testis and termination of the epididymis, constitute a large canal, and a large vesicle: while the vessels of the testicle, vas deferens and prostate duct, are narrow. Hence there are nowhere real glands, except for secreting a viscid liquor. And if a viscid liquor be separated from arteries without a follicle, it always stagnates in some considerable follicle. The semen, bile, liquor of the joints, and fat, afford examples of this.

The fluids may be likewise changed in their receptacles by the affusion of some new liquor. Thus the semen is thickened by the addition of the liquor of the prostate; the chyle is attenuated by mixture with the saliva of the pancreas and the gastric and intestinal juices, and by the affusion of the bile it becomes alkalescent; the albumen of the joints is tempered by the two kinds of fat.

Lastly, what is absorbed, may have its uses in the animal economy, after it is taken into the blood; thus the semen gives a surprising strength to male animals. For the most part, likewise, in fluids which are detained an acrimony of an alkalescent nature is generated, which also hath its uses, as in the bile and semen.

But the most important use of the follicles and receptacles is to preserve their peculiar fluids, for those times in which alone they are subservient to life, and that a large quantity of them may be collected to correspond with their uses at certain periods. Thus the bile is reserved for the time of digestion, the semen for due venery, and the mucus of the nostrils is accumulated in the night to moderate the force of the air passing through them in the day.

Therefore, as nature has framed machines which retard the fluids in large or small follicles, so she has made others to expel them at proper times. To some glands she has given particular muscles; as in the testicles of brutes, the urinary bladder, and the gall bladder, and in the intestines and stomach; or she has subjoined contiguous muscles to promote the discharge, as the biventer, masseter, muscles of the abdomen and diaphragm; or else she has given them a kind of nervous irritability, which, being excited to action by an indescribable stimulus, opens the shut passages to the milk, semen, tears, &c.; or from the contact of any thing acrid, as already mentioned, accelerates the discharge of the fluid; as happens to the bile, liquor of the stomach and intestines, and to the sebaceous matter.

SECRETI'TIOUS. *a.* (from *secretus*, Lat.) Parted by animal secretion (*Floyer*).

SE'CRETIST. *s.* (from *secret*.) A dealer in secrets (*Boyle*).

SE'CRETLY. *ad.* (from *secret*.) 1. Privately; privily; not openly; not publicly (*Addison*). 2. Latently; so as not to be obvious; not apparently (*Dryden*).

SE'CRETNESS. *s.* (from *secret*.) 1. State of being hidden. 2. Quality of keeping a secret (*Donne*).

SE'CRETORY. *a.* (from *secretus*, Latin.) Performing the office of secretion (*Ray*).

SECT, (*secta*.) a collective term, comprehending all such as follow the doctrines, or opinions, of some famous divine, or philosopher, &c.

The sects of philosophers among the ancients, particularly in Greece, were numerous: as the Pyrrhonians, Platonists, Epicureans, Stoics, Peripatetics, Academics, &c. See each under its proper article.

At present, the sects of philosophy are chiefly

Fig. 1.

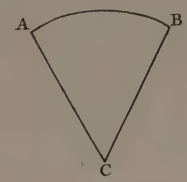


Fig. 2.

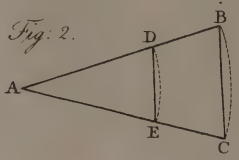


Fig. 3.



Mullow Sc. Russell Col.

London, Published by Sherwood & Co. Paternoster Row, Nov.r 1. 1812.

reducible to three; viz. the Cartesians, Peripatetics, and Newtonians. See CARTESIAN, &c.

In theology, the sects are much more numerous; yet the ancients had many legions, now extinct; as Manichees, Gnostics, Montanists, &c.

The principal now on foot are the Lutherans, Calvinists, Baptists, Arians, Socinians, and Arminians. The rise, progress, and fate, with the distinguishing characters and opinions of each, see under LUTHERAN, CALVINIST, &c.

SE'CTARISM. *s.* (from *sect.*) Disposition to petty sects, in opposition to things established (*King Charles*).

SE'CTARY. *s.* (*sectaire*, French.) 1. One who divides from public establishment, and joins with those distinguished by some peculiar sentiments (*Bacon*). 2. A follower; a pupil (*Spenser*).

SECTA'TOR. *s.* (*sectator*, Latin.) A follower; an imitator; a disciple (*Raleigh*).

SE'CTION. *s.* (*section*, Fr. *sectio*, Latin.) 1. The act of cutting or dividing (*Wotton*). 2. A part divided from the rest. 3. A small and distinct part of a writing or book (*Boyle*).

SECTION, in geometry, denotes a side or surface appearing of a body, or figure, cut by another; or the place where lines, planes, &c. cut each other.

The common section of two planes is always a right line; being the line supposed to be drawn by one plane in its cutting or entering the other. If a sphere be cut in any manner by a plane, the figure of the section will be a circle; also the common intersection of the surfaces of two spheres, is the circumference of a circle; and the two common sections of the surfaces of a right cone and a sphere, are the circumferences of circles if the axis of the cone pass through the centre of the sphere, otherwise not; moreover, of the two common sections of a sphere and a cone, whether right or oblique, if the one be a circle the other will be a circle also, otherwise not. See Hutton's 4to. Tracts, tract 7, prop. 7, 8, 9.

The sections of a cone by a plane, are five; viz. a triangle, circle, ellipse, hyperbola, and parabola. See each of these terms, as also CONIC SECTION.

Sections of buildings and bodies, &c. are either vertical, or horizontal, &c. The

Vertical section, or simply the section, of a building, denotes its profile, or a delineation of its heights and depths raised on the plan; as if the fabric had been cut asunder by a vertical plane, to discover the inside. And

Horizontal section is the ichnography or ground plan, or a section parallel to the horizon.

SECTOR, of a circle, is a portion of the circle comprehended between two radii and their included arc. Thus, the mixt triangle ABC, contained between the two radii AC and BC, and the arc AB, is a sector of the circle. Pl. 155, fig. 1.

The sector of a circle, as ABC, is equal to a triangle, whose base is the arc AB, and its altitude the radius AC or BC. And therefore the radius being drawn into the arc, half the product gives the area.

SECTORS (Similar), are those which have equal angles included between their radii. These are to each other as the squares of their bounding arcs, or as their whole circles.

SECTOR also denotes a mathematical instrument, of great use in finding the proportion between quantities of the same kind: as between lines and lines, surfaces and surfaces, &c. whence the French call it the compass o proportion.

The great advantage of the sector above the common scales, &c. is, that it is made so as to fit all radiuses, and all scales. By the lines of chords, sines, &c. on the sector, we have lines of chords, sines, &c. to any radius betwixt the length and breadth of the sector when open.

The sector is founded on the fourth proposition of the sixth book of Euclid; where it is demonstrated, that similar triangles have their homologous sides proportional. An idea of the theory of its construction may be conceived thus. Let the lines AB, AC, (pl. 155. fig. 2,) represent the legs of the sector; and AD, AE, two equal sections from the centre: if, now, the points CB and DE be connected, the lines CB and DE will be parallel; therefore the triangles ADE, ACB, will be similar; and, consequently, the sides AD, DE, AB, and BC, proportional; that is, as AD : DE : : AB : BC: whence, if AD be the half, third, or fourth part of AB; DE will be a half, third, or fourth part of CB: and the same holds of all the rest.

If, therefore, AD be the chord, sine, or tangent, of any number of degrees to the radius AB; DE will be the same to the radius BC.

Description of the sector.—The instrument consists of two rulers, or legs, of brass or ivory, or any other matter, representing the radii, moveable round an axis or joint, the middle of which expresses the centre; whence several scales are drawn on the faces of the rulers. See pl. 155, fig. 3.

The scales generally put on sectors may be distinguished into single and double. The single scales are such as are commonly put upon plain scales: the double scales are those which proceed from the centre; each scale is laid twice on the same face of the instrument, viz. once on each leg: from these scales, dimensions or distances are to be taken, when the legs of the instrument are in an angular position.

The scales commonly put upon the best sectors are

Single	1	a line of	Inches, each inch divided into 8 and 10 parts.	
	2		Decimals, containing 100 parts.	
	3		Chords,	marked Cho.
	4		Sines,	Sin.
	5		Tangents,	Tang.
	6		Rhumbs,	Rum.
	7		Latitude,	Lat.
	8		Hours,	Hou.
	9		Longitude,	Lon.
	10		Inclin. Merid.	In. Mer.
	11		the Numbers,	Num.
	12		Loga- Sines,	Sin.
	13		rithms Versed sines,	V. Sin.
	14		of Tangents,	Tan.

Double	1	a line of	Lines, or of equal parts,	marked Lin.
	2		Chords,	Cho.
	3		Sines,	Sin.
	4		Tangents to 45°	Tan.
	5		Secants,	Sec.
	6		Tangents to above 45°	Tan.
	7		Polygons,	Pol.

The manner in which these scales are disposed of on the sector, is best seen in the figure.

The scales of lines, chords, sines, tangents, rhumbs, latitudes, hours, longitude, incl. merid. may be used, whether the instrument is shut or open, each of these scales being contained on one of the legs only. The scales of inches, decimals, log. numbers, log. sines, log. versed sines, and log. tangents, are to be used with the sector quite opened, part of each scale lying on both legs.

The double scales of lines, chords, sines, and lower tangents, or tangents under 45 degrees, are all of the same radius or length; they begin at the centre of the instrument, and are terminated near the other extremity of each leg; viz. the lines at the division 10, the chords at 60, the sines at 90, and the tangents at 45; the remainder of the tangents, or those above 45°, are on other scales beginning at $\frac{1}{4}$ of the length of the former, counted from the centre, where they are marked with 45, and run to about 76 degrees.

The secants also begin at the same distance from the centre, where they are marked with 10, and are from thence continued to as many degrees as the length of the sector will allow, which is about 75°.

The angles made by the double scales of lines, of chords, of sines, and of tangents to 45 degrees, are always equal. And the angles made by the scales of upper tangents, and of secants, are also equal; and sometimes these angles are made equal to those made by the other double scales. The scales of polygons are put near the inner edge of the legs, their beginning is not so far removed from the centre, as the 60 on the chords is. Where these scales begin, they are marked with 4, and from thence are figured backwards, or towards the centre, to 12.

From this disposition of the double scales, it is plain, that those angles which were equal to each other, while the legs of the sector were close, will still continue to be equal, although the sector be opened to any distance it will admit of.

The scale of inches is laid close to the edge of the sector, and sometimes on the edge; and contains as many inches as the instrument will receive when opened: each inch being usually divided into eight, and also into ten equal parts. The decimal scale lies next to this: it is of the length of the sector, when opened, and is divided into ten equal parts, or primary divisions, and each of these into ten other equal parts; so that the whole is divided into a hundred equal parts: and if the sector admits of it, each of the subdivisions is divided into two, four or five parts; and by this decimal scale, all the other scales, that are taken from tables, may be laid down. The length of a sector is usually understood when it is shut; and therefore, a sector of six inches makes a ruler of twelve inches when opened; and a foot sector is two feet long when quite opened.

The scale of logarithmic or artificial numbers, called Gunter's scale, or Gunter's line, is a scale expressing the logarithms of common numbers, taken in their natural order.

For the construction of this scale, and also of those of logarithmic sines, logarithmic tangents, and logarithmic versed sines, see Gunter's line, and Gunter's scale.

We shall here observe, that all these scales should have one common termination to one end of each scale, i. e. the 10 on the numbers, the 90 on the sines, the 0 on the versed sines, and the 45 on the tangents, should be opposite to each other: the other end of each of the scales of sines, versed sines, and tangents, will run out beyond the beginning (marked 1) of the numbers; nearly opposite to which will be the divisions representing 35 minutes on the sines and tangents, and $168\frac{1}{2}$ degrees on the versed sines.

The double scales are constructed in the fol-

lowing manner. The line of lines is only a scale of equal parts, whose length is adapted to that of the legs of the sector: thus, in the six-inch sector, the length is about $5\frac{3}{4}$ inches. The length of this scale is divided into primary divisions; each of these into ten equal secondary parts; and each secondary division into four equal parts. The accuracy of the division may be determined by taking between the compasses any number of equal parts from this line, and applying that distance to all the parts of the line; and if the same number of divisions be contained between the points of the compasses in every application, the scale may be received as perfect. The line of sines is constructed by making the whole length of this scale equal to that of the line of lines; and from this line taking off severally the parts expressed by the numbers in the tables of the natural sines, corresponding to the degrees, or to the degrees and minutes, intended to be laid upon the scale: and then by laying down these several distances on the scale, beginning from the centre. In scales of this length, it is customary to lay down divisions, expressing every 15 minutes from 0 degree to 60 degrees; between 60 and 80 degrees, every half degree is expressed; then every degree to 85; and the next is 90 degrees. The length of the scale of tangents is equal to that of the line of lines, and the several divisions upon it (to 45 degrees) are laid down from the tables and line of lines, in the same manner as the former; observing to use the natural tangents in the tables. The scale of upper tangents is laid down by taking $\frac{1}{4}$ of such of the natural tabular tangents above 45 degrees, as are intended to be put upon the scale. The beginning of this scale, at 45 degrees, though the position of it on the sector respects the centre of the instrument, is distant from the centre $\frac{1}{4}$ of the length or radius of the lower tangents.

The distance of the beginning of the scale of secants from the centre, and the manner of laying it down are the same as those of the upper tangents: except that in this the tabular secants are to be used.

For the scale of chords; its length is to be made equal to that of the sines; and the divisions, which are twice the length of the sines of half the degrees and minutes, counted from the centre, express every 15 minutes from 0 degrees to 60 degrees, to be laid down as in the scale of sines.

The scale of polygons usually comprehends the sides of the polygons from six to twelve sides inclusive. The divisions are laid down by taking the lengths of the chords of the angles at the centre of each polygon, and laying them down from the centre of the instrument. When the polygons of four and five sides are also introduced, this line is constructed from a scale of chords, where the length of 90 degrees is equal to that of 60 degrees of the double scale of chords on the sector. Instead of some of the double scales above described, there are found other scales on the old sectors, and also on some of the French ones, such as scales of superficies, of solids, of inscribed bodies, of metals, &c. but these are left out to make room for others of more general use. See CALIBER.

In describing the use of the sector, the terms, lateral distance and transverse distance, often occur. By the former is meant the distance taken with the compasses on one of the scales only, beginning at the centre of the sector; and by the latter, the distance taken between any two corresponding divisions of the scales of the same name, the legs of the sector being in an angular position: but in taking these transverse distances, it is to be observed, that each of the several scales hath three parallel lines, across which the divisions of the scale are marked, and that the points of the compasses must be always set on the inside line, or that line next the inner edge of the leg, which is the only line, in each scale, which runs to the centre.

SECTOR (Use of the line of lines on the), 1. To divide a given line into any number of equal parts; e. g. 9. Make the length of the given line or some known part thereof, a transverse distance to 9 and 9: then will the transverse distance of 1 and 1 be the $\frac{1}{9}$ part thereof; or such a submultiple of the $\frac{1}{9}$ part, as was taken of the given line: or, the $\frac{1}{9}$ part will be the difference between the given line, and the transverse distance of 8 and 8. Hence, 2. To make a scale of a given length, to contain a given number of equal parts; e. g. let the scale to the map of a survey be 6 inches long, and contain 140 poles, and let it be required to open the sector, so that a corresponding scale may be taken from the line of lines. Make the transverse distance 7 and 7 (or 70 and 70, viz. $\frac{1}{2}$ 40) equal to 3 inches ($=\frac{6}{2}$); and this position of the line of lines will produce the given scale.

3. To divide a given line (e. g. of 5 inches) into any assigned proportion, as of 4 to 5. Make 5 inches the length of the given line, a transverse distance to 9 and 9, the sum of the proposed parts; and the transverse distances of the assigned numbers, 4 and 5, will be the parts required.

4. To 2 given lines, viz. 2 and 6, to find a third proportional. Take between the compasses the lateral distance of the second term, viz. 6; set one point on the division expressing the first term, viz. 2, on one leg, and open the legs of the sector till the other point will fall on the corresponding division on the other leg: keeping the legs of the sector, in this position, take the transverse distance of the second term, viz. 6, and this distance is the third term required, which distance, measured laterally from the centre, will give 18, the number required: for 2 : 6 : : 6 : 18. Otherwise, take the distance 2 laterally, and apply it transversely to 6 and 6, the sector being properly opened; then the transverse distance at 2 and 2, being taken with the compasses, and applied laterally from the centre of the sector on the scale of lines, will give the third term, when the proportion is decreasing: for 6: 2 : : 2 : $\frac{2}{3}$. If the legs of the sector will not open so far as

to let the lateral distance of the second term fall between the divisions expressing the first term; then take $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, or any aliquot part of the second term, that will conveniently fall within the opening of the sector, and make such part the transverse distance of the first term: then, if the transverse distance of the second term be multiplied by the denominator of the part taken of the second term, the product will give the third term.

5. To 3 given lines, viz. 3, 7, and 10, to find a fourth proportional. Open the legs of the sector, till the transverse distance of the first term, 3, be equal to the lateral distance of the second term, 7, or to some part thereof; then will the transverse distance of the third term, 10, give the fourth term, $23\frac{1}{3}$, required; or such a submultiple thereof as was taken of the second term; for $3 : 7 :: 10 : 23\frac{1}{3}$. Otherwise, set the lateral distance 7 transversely from 10 to 10, opening the sector accordingly; and the transverse distance at 3 and 3 applied laterally will give $2\frac{1}{10}$; for $10 : 7 :: 3 : 2\frac{1}{10}$.

6. To diminish a line of 4 inches in the proportion of 8 to 7. Open the sector till the transverse distance of 8 and 8 be equal to the lateral distance of 7: mark the point, where 4 inches, as a lateral distance, taken from the centre, reaches; and the transverse distance, taken at that point, will be the line required. If the line should be too long for the legs of the sector, take $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$, &c. part of the given line for the lateral distance, and the corresponding transverse distance, taken twice, thrice, or four times, &c. will be the line required.

7. To open the sector so, that the 2 scales of lines shall make a right angle. Take the lateral distance from the centre of the division, marked 5, between the points of the compasses, and set one foot in the division marked 4 on one of the scales of lines, and open the legs of the sector till the other foot falls on the division marked 3, on the other scale of lines; and then will those scales stand at right angles to one another; for the lines 3, 4, 5, or any of their multiples, constitute a right angled triangle.

8. To 2 right lines given, e. g. 40 and 90, to find a mean proportional. Set the 2 scales of lines at right angles; find the half sum of the given lines, viz. 65, and the half difference, viz. 25; and take with the compasses the lateral distance of the half sum, 65, and apply one foot to the half difference, 25, the other foot transversely will reach to 60, the mean proportional required; for $40 : 60 :: 60 : 90$.

SECTOR (Use of the scale of chords on the), 1. To open the sector so that the two scales of chords may make an angle of any number of degrees, e. g. 40. Take the distance from the joint to 40, the number of degrees proposed on the scale of chords; open the sector till the transverse distance from 60 to 60, on each leg, be equal to the aforesaid lateral distance of 40: then do the scales of chords make the angle required.

2. The sector being opened, to find the degrees of its aperture. Take the extent from 60 to 60, and lay it off on the scale of chords from the centre: the number, where it terminates, shews the degrees of its opening. By applying sights on the scale of chords, the sector may be used to take angles, as a surveying instrument.

3. To protract or lay down an angle, of any given number of degrees. 1. Let the number of degrees be less than 60, viz. 46. At any opening of the sector, take the transverse distance of 60 and 60 on the chords; and with this opening describe an arc: take the transverse distance of the given number of degrees 46, and lay this distance on the arc described, marking its extremities: from the centre of the arc, through these extremities, draw two lines, and they will contain the angle required. 2. When the degrees given are more than 60, viz. 148. Describe the arc as before; take the transverse distance of $\frac{1}{2}$ or $\frac{1}{3}$ of the given degrees, 148, e. g. $\frac{1}{3}=49\frac{1}{3}$ degrees: lay this distance on the arc thrice; and from the centre draw two lines to the extremities of the arc thus determined, and they will contain the required angle. N. B. If the radius of the arc or circle is to be of a given length; then make the transverse distance of 60 and 60 equal to that assigned length.

4. To find the degrees which a given angle contains. About the vertex describe an arc, and open the sector till the distance from 60 to 60, on each leg, be equal to the radius of the circle; then taking the chord of the arc between the compasses, and carrying it on the legs of the sector, see what equal number, on each leg, the points of the compasses fall on: this is the quantity of degrees the given angle contains.

5. To take an arc, of any quantity, from off the circumference of a circle. Open the sector till the distance from 60 to 60 be equal to the radius of the given circle; then take the extent of the chord of the number of degrees, on each leg of the sector, and lay it off on the circumference of the given circle. By this use, may any regular polygon be inscribed in a given circle, as well as by the line of polygons: e. g. in a circle whose diameter is given to describe a regular polygon of 24 sides. Make the given diameter, a transverse distance from 60 to 60 on the scales of chords; divide 360 by 24, and take the transverse distance of 15 and 15, the quotient, and this will be the chord of the twenty-fourth part of the circumference. In order to prevent errors, where the distance is to be repeated several times, it will be best to proceed thus: with the chord of 60 degrees divide the circumference into 6 equal parts; in every division of 60 degrees lay down, first the chord of 15 degrees, and next the chord of 30 degrees, and then the chord of 45 degrees, beginning always at the same point. Thus the error in taking distances will not be multiplied into any of the divisions following the first.

SECTOR (Use of the line of polygons on the), 1. In a given circle to inscribe a regular polygon, e. g. an octagon. Open the legs of the sector, till the transverse distance of 6 and

6 be equal to the given radius, then will the transverse distance of 8 and 8 be the side of an octagon, which may be inscribed in the given circle. In like manner may any other polygon, the number of whose sides does not exceed 12, be inscribed in a given circle. 2. On a given line to describe a regular polygon, e. g. a pentagon. Make the given line a transverse distance to 5 and 5: at that opening of the sector, take the transverse distance of 6 and 6; and with this radius, on the extremities of the line, as centres, describe arcs, intersecting each other; and on the point of intersection, as a centre, with the same radius, describe a circumference passing through the extremities of the given line; and in this circle may the pentagon, whose side is given, be inscribed. By a like process may any other polygon, of not more than 12 sides, be described on a given line. 3. On a right line, to describe an isosceles triangle, having the angles at the base double that at the vertex. Open the sector till the ends of the given line fall on 10 and 10 on each leg; then take the distance from 6 to 6; this will be the length of the two equal sides of the triangle.

SECTOR (Use of the scales of sines, tangents, and secants, on the). By the several lines disposed on the sector we have scales to several radiuses: so that 1. having a length, or radius, given, not exceeding the length of the sector when opened, we find the chord, sine, &c. thereto: e. g. suppose the chord, sine, or tangent, of 10 degrees to a radius of 3 inches required. Make 3 inches the aperture, or transverse distance, between 60 and 60 on the scales of chords of the two legs; then will the same extent reach from 45 to 45 on the scale of tangents, and from 90 to 90 on the scale of sines on the other side; so that to whatever radius the line of chords is set, to the same are all the others set. In this disposition, therefore, if the aperture, or transverse distance, between 10 and 10, on the scales of chords, be taken with the compasses, it will give the chord of 10 degrees; if the transverse distance of 10 and 10 be in like manner taken, on the scales of sines, it will be the sine of 10 degrees: lastly, if the transverse distance of 10 and 10 be in like manner taken on the scales of tangents, it gives the tangent of 10 degrees, to the same radius.

2. If the chord, or tangent, of 70 degrees were required: for the chord, the transverse distance of half the arc, viz. 35, must be taken, as before; which distance, being repeated twice, gives the chord of 70 degrees. To find the tangent of 70 degrees, to the same radius, the scale of upper tangents must be used, the other only reaching to 45: making, therefore, 3 inches the transverse distance between 45 and 45 at the beginning of that scale; the extent between 70 and 70 degrees, on the same, will be the tangent of 70 degrees to 3 inches radius.

3. To find the secant of an arc, make the given radius the transverse distance between 0 and 0 on the line of secants; then will the transverse distance of 10 and 10, or 70 and 70, on the said lines, give the secant of 10 degrees, or 70 degrees.

The scales of upper tangents and secants do not run quite to 76 degrees; but those of a greater number of degrees may be found by the sector in the following manner. Thus, the tangent of any number of degrees may be taken from the sector at once; if the radius of the circle can be made a transverse distance to the complement of those degrees on the lower tangent. E. g. To find the tangent of 78 degrees to a radius of 2 inches. Make 2 inches a transverse distance to 12 degrees on the lower tangents: then the transverse distance of 45 degrees will be the tangent of 78 degrees. In like manner the secant of any number of degrees may be taken from the sines, if the radius of the circle can be made a transverse distance to the cosine of those degrees. Thus making 2 inches a transverse distance to the sine of 12 degrees, then the transverse distance of 90 and 90 will be the secant of 78 degrees. Hence it will be easy to find the degrees answering to a given line, expressing the length of a tangent or secant, which is too long to be measured on those scales, when the sector is set to the given radius. Thus, for a tangent, make the given line a transverse distance to 45 and 45 on the lower tangents; then take the given radius, and apply it to the lower tangents: and the degrees, where it becomes a transverse distance, give the cotangent of the degrees answering to the given line. And for a secant, make the given line a transverse distance to 90 and 90 on the sines: then the degrees answering to the given radius applied as a transverse distance on the sines, will be the cosine of the degrees answering to the given secant line.

4. If the converse of any of these things were required, that is, if the radius be required, to which a given line is the sine, tangent, or secant: it is but making the given line, if a chord, the transverse distance on the line of chords, between 10 and 10, and then the sector will stand at the radius required: that is, the aperture between 60 and 60, on the said line, is the radius.

If the given line were a sine, tangent, or secant, it is but making it the transverse distance of the given number of degrees: then will the distance of 90 and 90 on the sines, of 45 and 45 on the lower tangents near the end of the sector, and of 45 and 45 on the upper tangents towards the centre of the sector, and of 0 and 0 on the secants, be the radius.

5. If the radius, and any line representing a sine, tangent, or secant, be given, the degrees corresponding to that line may be found by setting the sector to the given radius, according as a sine, tangent, or secant, is concerned; taking the given line between the compasses, applying the two feet transversely to the scale concerned, and sliding the feet along till they both rest on like divisions on both legs: and the divisions will shew the degrees and parts corresponding to the given line.

For the method of determining the degrees

answering to any tangent, or secant, that cannot be thus measured, see above

6. To find the length of a versed sine to a given number of degrees, and a given radius. Make the transverse distance of 90 and 90 in the sines equal to the given radius; take the transverse distance of the sine complement of the given degrees; if the given degrees are less than 90, the difference; but if greater, the sum of the sine complement and radius gives the versed sine.

7. To open the legs of the sector so that the corresponding double scales of lines, chords, sines, tangents, may make, each of them, a right angle. On the lines, make the lateral distance 10, and a distance between 8 on one leg, and 6 on the other leg; on the sines, make the lateral distance 90 a transverse distance from 45 to 45, or from 40 to 50, or from 30 to 60, or from the sine of any degrees to their complement: or, on the sines, make the lateral distance of 45 a transverse distance between 30 and 30.

SECTOR IN TRIGONOMETRY (Use of the). 1. The base and perpendicular of a right-angled triangle being given, to find the hypothenuse. Suppose the base 40 miles, and the perpendicular 30; open the sector till the two scales of lines make a right angle: then, for the base, take 40 parts on the scale of lines on one leg; and, for the perpendicular, take 30 on the same scale on the other leg: then the extent from 40 on the one to 30 on the other, taken in the compasses, will be the length of the hypothenuse; which line, applied to the scale of lines, will be found 50 miles.

2. The perpendicular of a right-angled triangle being given, 30, and the angle 37 degrees; to find the hypothenuse. Take the given side, and set it over, on each side, on the sine of the given angle, then the parallel distance of 90 and 90 or radius, will be the hypothenuse; which will measure 50 on the scale of lines.

3. The hypothenuse and base being given, to find the perpendicular. Open the sector till the two scales of lines be at right angles; then lay off the given base on one of those scales from the centre; take the hypothenuse in your compasses, and setting one foot in the term of the given base, let the other fall on the scale of lines on the other leg: the distance from the centre to the point where the compasses fall will be the length of the perpendicular.

4. The hypothenuse being given, and one of the acute angles; to find the perpendicular. Make the given hypothenuse a parallel radius, i. e. make it the extent from 90 to 90 on the scales of sines; then will the parallel sine of the angle be the length of the side.

5. The base and perpendicular given, to find the angle. Lay off the base, on both sides the sector, from the centre, and note its extent; then take the given perpendicular, and to it open the sector in the terms of the base: the parallel radius will be the tangent of the required angle.

6. In any right-lined triangle, two sides being given, with the included angle; to find the third side. Suppose one side 20, the other side 30, and the included angle 110 degrees; open the sector till the two scales of lines make an angle equal to the given angle, viz. 110 degrees; lay off the given sides of the triangle, from the centre of the sector, on each of the scales of lines: the extent between their extremes is the length of the side sought.

7. The three angles of a triangle being given; to find the proportion of the sides. Take the lateral sines of the several angles, and measure them in the scale of lines; the numbers answering thereto give the proportion of the sides.

8. The three sides being given, to find an angle ACB. Lay the sides along the scales of lines, from the centre, and set over the side in their terms: so is the sector opened, in these lines, to the quantity of the angle required.

9. The hypothenuse AC of a right-angled spherical triangle ABC, given, e. g. 43 degrees, and the angle CAB 20 degrees; to find the side CB. The rule is, as radius is to the sign of the given hypothenuse 43 degrees, so is the sine of the given angle 20 degrees to the sine of the perpendicular CB. Take then 20 degrees from the centre, along the scale of sines, in your compasses, and set the extent from 90 to 90, on the two legs; and the parallel sine of 43 degrees, the given hypothenuse, will, when measured from the centre on the scale of sines, give 13° 30′, the side required.

10. The perpendicular BC, and the hypothenuse AC given, to find the base AB. As the sine complement of the perpendicular BC is to radius, so is the sine complement of the hypothenuse to the sine complement of the base. Therefore make the radius a parallel sine of the complement of the given perpendicular, e. gr. 76° 30′; then the parallel sine of the complement of the hypothenuse, e. gr. 47°, measured along the scale of sines, will be found 49° 25′, the complement of the base required; consequently the base itself will be 40° 35′.

SECULAR, that which relates to affairs of the present world, in which sense the word stands opposed to spiritual, ecclesiastical: thus we say secular power, &c.

SECULAR, is more peculiarly used for a person who lives at liberty in the world, not shut up in a monastery, nor bound by vows, or subjected to the particular rules of any religious community; in which sense it stands opposed to regular. The Romish clergy are divided into secular and regular, of which the latter are bound by monastic rules, the former not.

SECULAR GAMES, in antiquity, solemn games held among the Romans once in an age. These games lasted three days and as many nights; during which time sacrifices were performed, theatrical shows exhibited, with combats, sports, &c. in the Circus. The occasion of these games, according to Valerius Maximus, was to stop the progress of a plague. Valerius Publicola was the first who celebrated

them at Rome, in the year of the city 245. The solemnity was as follows: The whole world was invited, by a herald, to a feast which they had never seen already, nor ever should see again. Some days before the games began, the quindecimviri in the Capitol and the Palatine temple, distributed to the people purifying compositions, of various kinds, as flambeaus, sulphur, &c. From hence the populace passed to Diana's temple on the Aventine mount, with wheat, barley, and oats, as an offering. After this, whole nights were spent in devotion to the Destinies. When the time of the games was fully come, the people assembled in the Campus Martius, and sacrificed to Jupiter, Juno, Apollo, Latona, Diana, the Parcæ, Ceres, Pluto, and Proserpine. On the first night of the feast the emperor, with the quindecemviri, caused three altars to be erected on the banks of the Tiber, which they sprinkled with the blood of three lambs, and then proceeded to regular sacrifice. A space was next marked out for a theatre, which was illuminated with innumerable flambeaus and fires. Here they sung hymns, and celebrated all kinds of sports. On the day after, having offered victims at the Capitol, they went to the Campus Martius, and celebrated sports to the honour of Apollo, and Diana. These lasted till next day, when the noble matrons, at the hour appointed by the oracle, went to the Capitol to sing hymns to Jupiter. On the third day, which concluded the solemnity, 27 boys, and as many girls, sung in the temple of Palatine Apollo hymns and verses in Greek and Latin, to recommend the city to the protection of those deities whom they designed particularly to honour by their sacrifices.

The inimitable Carmen Seculare of Horace, was composed for this last day, in the secular games held by Augustus.

SECULAR EQUATIONS, in astronomy, are corrections required to compensate such inequalities in the motions of the heavenly bodies as are found to obtain in the course of a century. Thus, there are secular inequalities in the motion of the moon, which require for their correction so many distinct secular equations: and the like may be said of other bodies. See Vince's and Woodhouse's Treatises on Astronomy, Biot Astronomie de Physique, and Laplace Mecanique Celeste.

SECULA'RITY. *s.* (from *secular.*) Worldliness; attention to things of the present life (*Burnet*).

To SE'CULARIZE. *v. a.* (*secularise*r, Fr.) 1. To convert from spiritual appropriations to common use. 2. To make worldly.

SE'CULARLY. *ad.* (from *secular.*) In a worldly manner.

SE'CULARNESS. *s.* (from *secular.*) Worldliness.

SECUNDINE. (*Secundus*, i.e. *sequundus, a sequendo*, from following.) In botany. Floribus ad unum idemque latus versis. All turned towards one side, pointing one way, directed or inclining the same way. We have no proper English term for this. One-ranked tends to mislead, because a plant may have more ranks or rows of flowers than one directed to the same point of the horizon, or nearly so. It is exemplified in the flowers of erica herbacea, in the spike of dactylis cynosuroides, and in the panicle of dactylis glomerata, several of the festucæ, &c.

SECUNDINES. The placenta and membranes which are expanded from its edge, and which form a complete involucrum of the fetus and its waters, go under the common term of after-birth, or secundines.

The membranes of the ovum have usually been mentioned as two, the amnion and the chorion; and the latter has again been divided into the true and the false. The third membrane, which, from its appearance has likewise been called the villous or spongy, and from the consideration of it as the inner lamina of the uterus, cast off like the exuviæ of some animals. The decidua has been described by Harvey, not as one of the membranes of the ovum, but as a production of the uterus. The following is the order of the membranes of the ovum, at the full period of gestation: 1st, There is the outer or connecting, which is flacculent, spongy, and extremely vascular, completely investing the whole ovum, and lining the uterus. 2dly, The middle membrane, which is nearly pellucid, with a very few small blood-vessels scattered over it, and which forms a covering to the placenta and funis, but does not pass between the placenta and uterus. 3dly, The inner membrane, which is transparent, of a firmer texture than the others, and lines the whole ovum, making, like the middle membrane, a covering for the placenta and funis with the two last. The ovum is closed when it passes from the ovarium into the uterus, where the first is provided for its reception.

These membranes, in the advanced state of pregnancy, cohere slightly to each other, though, in some ova, there is a considerable quantity of fluid collected between them, which being discharged when one of the outer membranes is broken, forms one of the circumstances which have been distinguished by the name of by or false waters.

Between the middle and inner membrane, upon or near the funis, there is a small, flat, and oblong body, which, in the early part of pregnancy, seems to be a vesicle containing milky lymph, which afterwards becomes of a firm and apparently fatty texture. This is called the vesicula umbilicalis; but its use is not known. See PLACENTA.

SECUNDUS (John), a celebrated modern Latin poet of Holland, was born at the Hague in 1511, and died at Utrecht in 1536. Though he lived only 25 years, he left abundance of Latin poems: three books of elegies, one of epigrams, two of epistles, one of odes, one of sylvæ, or miscellaneous pieces; one of funeral inscriptions; besides some very obscene poems, called Basia. These, Dr. Watkins says, display *great delicacy*, and Dr. Lempriere characterises as *beautiful*; but if either of these

reverend gentlemen had seen them, they must have given a very different character. He also cultivated painting and engraving, but did not live to figure in these.

SECU'RE. *a.* (*securus*, Latin.) 1. Free from fear, exempt from terrour; easy; assured (*Milt.*). 2. Confident; not distrustful (*Dry.*). 3. Sure; not doubting (*Atterbury*). 4. Careless; wanting caution (*Judges*). 5. Free from danger; safe (*Milton*).

To SECU'RE. *v. a.* (from the adjective.) 1. To make certain; to put out of hazard; to ascertain (*Dryden*). 2. To protect; to make safe (*Watts*). 3. To insure.

SECU'RELY. *ad.* (from *secure.*) 1. Without fear; carelessly (*Atterbury*). 2. Without danger; safely (*Dryden*).

SECU'REMENT. *s.* (from *secure.*) The cause of safety; protection; defence (*Brown*).

SECURIDACA. In botany, a genus of the class diadelphia, order octandria. Calyx three-leaved; corol papilionaceous; the banner two-leaved within the wings; legume ovate, one-celled, one-seeded, terminating in a ligulate wing. Three species, natives of South America and Hispaniola: S. scandens, and S. volubilis, climbing shrubs; S. erecta, a branched tree, with purple, racemed flowers.

SECURIS (John), a native of Wiltshire, and a scholar of New-college, Oxford, in the reign of Edward VI. He became a physician, and settled at Salisbury, where he published annual pieces called Prognosticus, a kind of almanac, accompanied with astronomical predictions and medical precepts. He was also the author of A Detection and Querimony of the daily Enormities and Abuses committed in the three Branches of Physic. He died at the close of the 16th century.

SECU'RITY. *s.* (*securitas*, Latin.) 1. Carelessness; freedom from fear (*Hayw.*). 2. Vitious carelessness; confidence; want of vigilance (*Davies*). 3. Protection; defence (*Tillotson*). 4. Any thing given as a pledge or caution; insurance (*Arbuthnot*). 5. Safety; certainty.

SECUTORES, in antiquity, a kind of gladiators among the Romans, who fought against the retiarii. The secutores were armed with a sword and buckler, to keep off the net or noose of their antagonists, and they wore a casque on their head.

SEDAN, a strong town of France, in the department of the Ardennes. It is one of the most important keys of the country; and has a strong castle, an arsenal, a foundry of cannon, and a manufacture of black cloths of a superior quality. The famous marshal Turenne was born in the castle. Sedan is seated on the Maese, 26 miles S.E. of Charlemont, and 135 N.E. of Paris. Lon. 5. 2 E. Lat. 49. 42 N.

SEDAN CHAIR is a covered vehicle for carrying a single person, suspended by two poles, and borne by two men, hence denominated chairmen. They were first introduced in London in 1634, when sir Sanders Duncomb obtained the sole privilege to use, let, and hire a number of the said covered chairs, for 14 years.

SEDA'TE. *a.* (*sedatus*, Latin.) Calm; quiet; still; unruffled; undisturbed; serene.

SEDA'TELY. *ad.* (from *sedate.*) Calmly; without disturbance (*Locke*).

SEDA'TENESS. *s.* (from *sedate.*) Calmness; tranquillity; serenity; freedom from disturbance (*Addison*).

SEDATIVES. (*sedativa*, from *sedo*, to ease or assuage.) Sedantia. Those medicines are so termed which have the power of diminishing the animal energy, without destroying life. They are divided into sedativa soporifica, as papaver, hyosciamus, and sedativa refrigerantia, as sales neutri, acidi, &c.

SEDATIVE SALT OF HOMBERG. See BORACIC ACID.

SE DEFENDENDO, in law, a plea used for him that is charged with the death of another, by alleging that he was under a necessity of doing what he did in his own defence; as that the other assaulted him in such a manner, that if he had not done what he did, he must have been in hazard of his own life. But here the danger must appear so great as to be inevitable. See HOMICIDE.

SE'DENTARINESS. *s.* (from *sedentary.*) The state of being sedentary; inactivity.

SE'DENTARY. *a.* (*sedentaire*, French; *sedentarius*, Latin.) 1. Passed in sitting still; wanting motion or action (*Arbuthnot*). 2. Torpid; inactive; sluggish; motionless (*Milton*).

SEDGE. *s.* (ræcz, Saxon.) A growth of narrow flags; a narrow water flag. See IRIS PALUSTRIS.

SE'DGY. *a.* (from *sedge.*) Overgrown with narrow flags (*Shakspeare*).

SE'DIMENT. *s.* (*sediment*, Fr.) That which subsides or settles at the bottom (*Woodward*).

SEDITION, among civilians, is used for a factious commotion of the people, or an assembly of a number of citizens without lawful authority, tending to disturb the peace and order of the society. This offence is of different kinds: some seditions more immediately threatening the supreme power, and the subversion of the present constitution of the state; others tending only towards the redress of private grievances. Among the Romans, therefore, it was variously punished, according as its end and tendency threatened greater mischief. See lib. i. God. de Seditiosis, and Mat. de Crimin. lib. ii. n. 5. de Læsa Majestate. In the punishment, the authors and ringleaders were justly distinguished from those who, with less wicked intentions, joined and made part of the multitude.

The same distinction holds in the law of England and in that of Scotland. Some kinds of sedition in England amount to high treason, and come within the stat. 25 Edw. III. as levying war against the king. And several seditions are mentioned in the Scotch acts of parliament as treasonable. Bayne's Crim. Law of Scotland, pp. 33, 34. The law of Scotland makes riotous and tumultuous assemblies a species of sedition. But the law there, as well

as in England, is now chiefly regulated by the riot act, made 1 Geo. I. only it is to be observed, that the proper officers in Scotland, to make the proclamation thereby enacted, are sheriffs, stewards, and bailies of regalities, or their deputies; magistrates of royal boroughs, and all other inferior magistrates; high and petty constables, or other officers of the peace, in any county, stewartry, city, or town. And in that part of the island, the punishment of the offence is any thing short of death, which the judges, in their discretion, may appoint.

SEDI'TIOUS. *a.* (*seditiosus*, Lat.) Factious with tumult; turbulent (*Clarendon*).

SEDI'TIOUSLY. *ad.* (from *seditious*.) Tumultuously; with factious turbulence.

SEDI'TIOUSNESS. *s.* (from *seditious*.) Turbulence; disposition to sedition.

SEDLEY (sir Charles), of Aylesford in Kent, was of Wadham College, Oxford, but left it without a degree, and became one of the wits of the debauched court of Charles II. Though unprincipled, he was highly offended with the intrigue which James II. had with his daughter, who was in consequence ennobled by the title of countess of Dorchester. He espoused the more warmly the revolution, observing that he did it from gratitude; "For since his majesty," said he, "has made my daughter a countess, I wish to do all I can to make his daughter a queen." Sedley's works were published, 2 vols. 8vo., 1719, and consist of plays, translations, songs, epilogues, &c. but, though without much fire, they possess the dangerous art of insinuating loose and licentious principles. He died 1703.

SEDLITZ WATER. Seydschutz water. A simple saline mineral water. From chemical analysis it appears, that it is strongly impregnated with vitriolated magnesia or Epsom salt, and it is to this, along with probably the small quantity of muriat of magnesia, that it owes its bitter and saline taste, and its purgative properties. The diseases in which this water is recommended are, crudities of the stomach, hypochondriasis, amenorrhœa, and the anomalous complaints succeeding the cessation of the catamenia, œdematous tumours of the legs in literary men, hæmorrhoidal habits, and in scorbutic eruptions. See MINERAL WATERS.

SEDR, the high priest of the sect of Ali, among the Persians.

To SEDU'CE. *v. a.* (*seduco*, Lat.) To draw aside from the right; to tempt; to corrupt; to deprave; to mislead; to deceive (*Shaks.*).

SEDU'CEMENT. *s.* (from *seduce*.) Practice of seduction; art or means used in order to seduce (*Pope*).

SEDU'CER. *s.* (from *seduce*.) One who draws aside from the right; a tempter; a corrupter (*Shakspeare*).

SEDU'CIBLE. *a.* (from *seduce*.) Corruptible; capable of being drawn aside (*Brown*).

SEDUCTION, is the act of tempting and drawing aside from the right path, and comprehends every endeavour to corrupt any individual of the human race. This is the import of the word in its largest and most general sense; but it is commonly employed to express the act of tempting a virtuous woman to part with her chastity.

The seducer of female innocence practises the same stratagems of fraud to get possession of a woman's person, that the swindler employs to get possession of his neighbour's goods or money; yet the law of honour, which pretends to abhor deceit, and which impels its votaries to murder every man who presumes, however justly, to suspect them of fraud, or to question their veracity, applauds the address of a successful intrigue, though it be well known that the seducer could not have obtained his end without swearing to the truth of a thousand falsehoods, and calling upon God to witness promises which he never meant to fulfil.

The law of honour is, indeed, a very capricious rule, which accommodates itself to the pleasures and conveniencies of higher life; but the law of the land, which is enacted for the equal protection of high and low, may be supposed to view the guilt of seduction with a more impartial eye. Yet for this offence, even the laws of this kingdom have provided no other punishment than a pecuniary satisfaction to the injured family; which, in England, can be obtained only by one of the quaintest fictions in the world, by the father's bringing his action against the seducer for the loss of his daughter's service during her pregnancy and nurturing. See *Paley's Moral Philosophy*, Book III. part iii. chap. 3.

The seduction of married women, indeed, has of late years been punished in a more exemplary way by large damages awarded in our courts of justice; and efforts have also been made, though as yet unsuccessfully, by some well meaning individuals, to add to the punishments inflicted on adulterers by the existing statutes.

SEDU'LITY. *s.* (*sedulitas*, Lat.) Diligent assiduity; laboriousness; industry; application; intenseness of endeavour (*South*).

SE'DULOUS. *a.* (*sedulus*, Latin.) Assiduous; industrious; laborious; diligent; painful (*Swift*).

SE'DULOUSLY. *ad.* (from *sedulous*.) Assiduously; industriously; laboriously; diligently; painfully (*Philips*).

SE'DULOUSNESS. *s.* (from *sedulous*.) Assiduity; assiduousness; industry; diligence.

SEDUM; Orpine; Stone-crop; Live-long; Live-ever. In botany, a genus of the class decandria, order pentagynia. Calyx five-cleft; corol five-petalled; nectariferous scales five, at the base of the germ; capsules five, superior. Twenty-nine species, chiefly natives of the Levant, Spain, and Portugal. Nine common to the hedges, wet rocks, dry sands, or walls of our own country.

This plant is very well known in many of its species, whether indigenous or exotic. The following are those generally cultivated.

1. S. telephium. Orpine stone-crop.
2. S. anacompseros. Ever-green stone-crop.
3. S. aizoon. Yellow stone-crop.

4. S. populifolium. Poplar-leaved stone-crop.
5. S. stellatum. Starry stone-crop.
6. S. cepœa. Purslane-leaved stone-crop.
7. S. dosyphyllum. Thick-leaved stone-crop.
8. S. reflexum. Recumbent stone-crop.
9. S. rupestre. Rock stone-crop.
10. S. Hispanicum. Spanish stone-crop.
11. S. album. White stone-crop.
12. S. acre. Biting stone-crop, or wall-pepper.
13. S. sexangule. Insipid stone-crop.
14. S. Anglicum. English or mild white stone-crop.
15. S. annuum. Annual stone-crop.

All are hardy, herbaceous, succulent, perennials in the root, though most of them annual in the stalk, which rising in the spring, flowers in June, July, and August: the flowers consisting universally of five spreading petals, generally crowning the stalks numerously in corymbs, cymes, and spikes, appearing tolerably conspicuous, and succeeded by a large quantity of seeds in the autumn, by which, as also by parting the roots, or by slips or cuttings, they may be easily propagated. As flowering plants they are mostly employed to embellish rock work and ruins, the roots being surrounded at first with a little mud, after which they will readily shoot into the adjoining crevices. Two or three of them are employed as salads in Holland. The wall-pepper is a strong stimulant; it blisters the skin when applied to it, and excites vomiting when eaten. It has been used with advantage in quartan agues and scorbutic affections. Goats eat it; cows, horses, sheep, and swine, refuse it. See ILLECEBRA, under which name it is best known in the dispensatories.

SEE. *s.* (*sedes*, Latin.) The seat of episcopal power; the diocese of a bishop (*Shaks.*).

To SEE. *v. a.* preterit *I saw*; part. pass. *seen*. (ꝛeon, Saxon; *sien*, Dutch.) 1. To perceive by the eye (*Locke*). 2. To observe; to find (*Milton*). 3. To discover; to descry (*Shakspeare*). 4. To converse with (*Locke*). 5. To attend; to remark (*Addison*).

To SEE. *v. n.* 1. To have the power of sight; to have by the eye perception of things distant (*Bacon*). 2. To discern without deception (*Tillotson*). 3. To inquire; to distinguish (*Shakspeare*). 4. To be attentive (*Shakspeare*). 5. To scheme; to contrive.

SEE. *interjection.* Lo; look; observe; behold (*Halifax*).

SEECHING, a town in Norfolk, with a market on Tuesday, seated on a small navigable river, four miles S. of Lynn, and 93 N.E. of London. Lon. 0. 24 E. Lat. 52. 44 N.

SEED. *s.* (ræꝺ, Saxon; *saed*, Dutch.) 1. The organized particle produced by plants and animals, from which new plants and animals are generated (*More*). 2. First principle; original (*Hooker*). 3. Principle of production (*Waller*). 4. Progeny; offspring; descendants (*Spenser*). 5. Race; generation; birth (*Waller*).

To SEED. *v. n.* (from the noun.) 1. To grow to perfect maturity, so as to shed the seed (*Swift*). 2. To shed the seed (*Mortimer*).

SEED, in botany, the rudiment or embryo of a new plant. Or, the deciduous plant of a vegetable, containing the rudiment of another vegetable of the same species, vivified by the pollen. It is analogous to the egg in animals.

A seed consists of three principal parts: 1. The tegument or skin. 2. The albumen splitting into cotyledons or lobes. 3. The corculum, corcle or heartlet. Some seeds also have a hilum or eye; others an aril; others again a coronet, coronula; which is either the calyx adhering; a pappus or down; a wing, tail, hook, awn, or other process, to assist in their dispersion.

SEED-BUD. See GERM.

SEED-COAT. See ARIL.

SEED-LEAVES. The primary leaves; being the cotyledons or lobes of a seed expanded, and in a state of vegetation.

SEED-LOBES. See COTYLEDON.

SEED-VESSEL, in botany. See PERICARP.

SEED (Jeremiah), of Clifton, near Penrith, in Cumberland, was educated at Lowther, and Queen's college, Oxford. He was curate of Twickenham, and in 1741 obtained from his college the rectory of Enham, Hants, where he died 1747. This excellent divine, deservedly esteemed for his private character, published discourses on several important subjects, 2 vols. 8vo. and after his death appeared his posthumous works, consisting of sermons, letters, &c.

SE'EDCAKE. *s.* (*seed* and *cake*.) A sweet cake interspersed with warm aromatic seeds (*Tusser*).

SE'EDLIP. SE'EDLOP. *s.* A vessel in which the sower carries his seed (*Ainsworth*).

SE'EDPEARL. *s.* (*seed* and *pearl*.) Small grains of pearl (*Boyle*).

SE'EDPLOT. *s.* (*seed* and *plot*.) The ground on which plants are sowed to be afterward transplanted (*Clarendon*).

SE'EDTIME. *s.* (*seed* and *time*.) The season of sowing (*Atterbury*).

SE'EDLING. *s.* (from *seed*.) A young plant just risen from the seed (*Evelyn*).

SE'EDNESS. *s.* (from *seed*.) Seedtime; the time of sowing (*Shakspeare*).

SE'EDSMAN. *s.* (*seed* and *man*.) 1. The sower; he that scatters the seed (*Shakspeare*). 2. One that sell seeds.

SE'EDY. *a.* (from *seed*.) Abounding with seed.

SEEING. *s.* (from *see*.) Sight; vision. See SIGHT, VISION, &c.

SE'EING, SE'EING *that*. *ad.* (from *see*.) Since; sith; it being so that (*Milton*).

To SEEK. *v. a.* pret. *I sought*; part. pass. *sought*. (ꝛecan, Saxon; *soecken*, Dutch.) 1. To look for; to search for (*Clarendon*). 2. To solicit; to endeavour to gain (*Milton*). 3. To go to find (*Dryden*). 4. To pursue by machinations (*Shakspeare*).

To SEEK. *v. n.* 1. To make search; to make inquiry (*Addison*). 2. To endeavour (*Milton*).

3. To make pursuit (*Deuteronomy*). 4. To apply to; to use solicitation (*Deuteronomy*). 5. To endeavour after (*Knolles*).

To SEEK, *ad.* At a loss; without measures, knowledge, or experience (*Roscommon*).

SEE'KER. *s.* (from *seek.*) One that seeks; an inquirer (*Glanville*).

SEE'KSORROW. *s.* (*seek* and *sorrow.*) One who contrives to give himself vexation (*Sidney*).

To SEEL. *v. a.* (*sceller*, to seal, French.) To close the eyes. A term of falconry, the eyes of a wild or haggard hawk being for a time seeled (*Bacon*).

To SEEL. *v. n.* (ÿllan, Saxon.) To lean on one side (*Raleigh*).

SEELING, in the manage. A horse is said to seel, when, upon his eye-brows, there grow white hairs, mixed with those of his usual colour, about the breadth of a farthing, which is a sure mark of old age. A horse never seels till he is fourteen years old, and always before he is fifteen, or sixteen at farthest: the light, sorrel, and black, seel sooner than others. Jockeys usually pull out those white hairs with pincers; but if there be so many it cannot be done without making the horse look bald and ugly, then they colour their eye-brows, that they may not appear old.

SEE'LY. *a.* (from *seel*, lucky time, Saxon). 1. Lucky; happy (*Spenser*). 2. Silly; foolish; simple (*Tusser*).

To SEEM. *v. n.* (*sembler*, French.) 1. To appear; to make a show; to have semblance (*Dryden*). 2. To have the appearance of truth (*Dryden*). 3. In *Shakspeare*, to be beautiful. 4. *It* SEEMS. There is an appearance though no reality (*Blackmore*). 5. It is sometimes a slight affirmation; *there are*, it seems, *many who are not pleased* (*Atterbury*). 6. It appears to be (*Brown*).

SEE'MER. *s.* (from *seem.*) One that carries an appearance (*Shakspeare*).

SEE'MING. *s.* (from *seem.*) 1. Appearance; show; semblance (*Shakspeare*). 2. Fair appearance (*Shakspeare*). 3. Opinion (*Milt.*).

SEE'MINGLY. *ad.* (from *seeming.*) In appearance; in show; in semblance (*Glanv.*).

SEE'MINGNESS. *s.* (from *seeming.*) Plausibility; fair appearance (*Digby*).

SEE'MLINESS. *s.* (from *seemly.*) Decency; handsomeness; comeliness; grace; beauty (*Camden*).

SEE'MLY. *a.* (*soommeligt*, Danish.) Decent; becoming; proper; fit (*Philips*).

SEE'MLY. *ad.* (from the adjective.) In a decent manner; in a proper manner (*Pope*).

SEEN. *a.* (from *see.*) Skilled; versed (*Dryden*).

SEER. *s.* (from *see.*) 1. One who sees (*Addison*). 2. A prophet; one who foresees future events (*Prior*).

SEER, a town of Arabia, capital of a principality, in the province of Oman. It is 108 miles W.S.W. of Julfar. Lon. 54. 38 E. Lat. 25. 10 N.

SEE'RWOOD. *s.* See SEARWOOD. Dry wood (*Dryden*).

SEE'SAW. *s.* (from *saw.*) A reciprocating motion (*Pope*).

To SEE'SAW. *v. n.* (from *saw.*) To move with a reciprocating motion (*Arbuthnot*).

To SEETH. *v. a.* preterit *I sod* or *seethed*; part. pass. *sodden* (seoðan, Saxon.) To boil; to decoct in hot liquor (*Spenser*).

To SEETH. *v. n.* To be in a state of ebullition; to be hot (*Shakspeare*).

SEE'THER. *s.* (from *seeth.*) A boiler; a pot (*Dryden*).

SEEZ, an ancient and considerable town of France, in the department of Orne, with a bishop's see; seated in a fine country, near the source of the Orne, 12 miles N. of Alencon, and 102 W. by S. of Paris. Lon. 0. 15 E. Lat. 48. 36 N.

SEGEBERG, a town of Lower Saxony, in the duchy of Holstein, with a castle, on a high mountain, consisting of limestone, large quantities of which are carried to Hamburg and Lubec. It is seated on the Trave, 22 miles S. of Kiel, and 28 N. of Hamburg. Lon. 10. 9 E. Lat. 54. 0 N.

SEGEDIN, a strong town of Lower Hungary, with a castle, taken from the Turks in 1686. It is seated at the confluence of the Teisse and Mastroch, 50 miles S.E. of Colocza. Lon. 20. 35 E. Lat. 46. 28 N.

SEGESTAN, a province of Persia, bounded on the N. by Korasan and Balck, on the E. by Candahar and Sablestan, on the S. by Mackeran, on the S.W. by Kerman, and on the W. by Covhestan and Farsistan.

SEGESWAR, a town of Transylvania, capital of a county of the same name. It is built in the manner of an amphitheatre, on the side of a hill, near the river Kokel, 47 miles N. of Hermanstadt. Lon. 24. 55 E. Lat. 47. 4 N.

SEGMENT, in geometry, is a part cut off the top of a figure by a line or plane; and the part remaining at the bottom after the segment is cut off, is called a frustum, or a zone. So, a

SEGMENT OF A CIRCLE, is a part of the circle cut off by a chord, or a portion comprehended by an arch and its chord; and may be either greater or less than a semicircle. The area is always equal to either the sum, or the difference of a circular sector whose arc is that of the segment, and of a triangle having two of its sides each equal to the radius of the circle, and the third equal to the chord of the segment.

There is a very comprehensive and useful table given, for finding the areas of circular segments, at the end of Dr. Hutton's Mensuration.

SEGMENTS (Similar), are those that have their chords directly proportional to their radii or diameters, or that have similar arcs, or such as contain the same number of degrees.

SEGMENT OF A SPHERE, is a part cut off by a plane.

The base of a segment is always a circle. And the convex surfaces of different segments, are to each other as their altitudes, or versed sines. And as the whole convex surface of the

sphere is equal to 4 of its great circles, or 4 circles of the same diameter; so the surface of any segment, is equal to 4 circles on a diameter equal to the chord of half the arc of the segment. So that if d denote the diameter of the sphere, or the chord of half the circumference, and c the chord of half the arc of any other segment, also a the altitude or versed sine of the same; then,

$3{\cdot}1416d^2$ is the surface of the whole sphere, and $3{\cdot}1416c^2$, or $3{\cdot}1416ad$, the surface of the segment.

For the solid content of a segment there are two rules usually given; viz. 1. To 3 times the square of the radius of its base, add the square of its height; multiply the sum by the height, and the product by ·5236. Or, 2dly, From 3 times the diameter of the sphere, subtract twice the height of the frustum; multiply the remainder by the square of the height, and the product by ·5236. That is, in symbols, the solid content is either

$= {\cdot}5236a \times (3r^2 + a^2)$ or $= {\cdot}5236a^2 \times (3d - 2a)$; where a is the altitude of the segment, r the radius of its base, and d the diameter of the whole sphere.

SEGNA, a strong seaport, capital of Hungarian Dalmatia, with a fort, and a bishop's see. It is seated on the gulf of Venice, 100 miles N.W. of Spoletto. Lon. 15. 21 E. Lat. 45. 22 N.

SE'GNITY. *s.* (from *segnis*, Latin.) Sluggishness; inactivity.

SEGO, a city of Negroland, the capital of Bambara. It consists of four walled towns, two on each side the river Niger, which contain about 30,000 inhabitants; and as the Moors form a considerable proportion, their mosques appear in every quarter. The houses are built of clay, of a square form, with flat roofs; some of them have two stories, and many of them are white-washed. The current money consists of couries, a kind of shells. It is 290 miles W.S.W. of Tombuctoo. Lon. 2. 46 W. Lat. 14. 15 N.

SEGORBE, a town of Spain, in Valencia, and a bishop's see. Here are many well-cultivated gardens, and the country abounds in every kind of fruit. In the adjacent mountains are quarries of fine marble. It is seated on the side of a hill, by the river Morvedro, 35 miles N. by W. of Valencia.

SEGOVIA, a city of Spain, in Old Castile, and a bishop's see, with a castle. It stands on two hills, and the valley by which they are separated, on the S.W. side of the Eresma; and is surrounded by a strong wall, flanked with towers and ramparts. It is supplied with water by a Roman aqueduct, 3000 paces in length, supported by 177 arches of a prodigious height, in two rows, one above the other. Here the best cloth in Spain is made, which is one part of its trade, and another is very fine paper. The cathedral stands on one side of the great square, and is one of the handsomest Gothic structures in Spain; beside which there are 27 other churches. The castle is seated in the highest part of the town, and has 16 rooms richly adorned with tapestry, and ornaments of marble and porphyry. The royal chapel is magnificently gilded, and embellished with very fine paintings. The mint, for some years the only one in Spain, is surrounded by the river, on which are mills, employed in coining. Segovia is 40 miles N.N.W. of Madrid. Lon. 4. 12 W. Lat. 41. 3 N

SEGOVIA (New), a town of Mexico, in Nicaragua, seated near the source of a river of its name, which flows into the Caribbean sea, 90 miles N. by E. of Leon. Lon. 87. 5 W. Lat. 13. 45 N

SEGOVIA (New), a town in the isle of Luconia, and a bishop's see, with a fort. It is seated at the N. end of the island, near the mouth of the Cagayan, 240 miles N. of Manilla. Lon. 120. 59 E. Lat. 18. 39 N.

SEGRA, a river of Spain, which rises in the Pyrenees, and runs S.W. through Catalonia, passing by Puicerda, Urgel, Belaguer, and Lerida, to Mequinenza, where it joins the Ebro.

SEGREGATA POLYGAMIA, in botany. Segregate polygamy. Cum flosculi plures calyce communi comprehensi propriis perianthiis etiam instruuntur. When several florets comprehended within a common calyx are furnished also with their proper perianths. These constitute the fifth order of the class syngenesia.

To SE'GREGATE. *v. a.* (*segrego*, Latin.) To set apart; to separate from others.

SEGREGA'TION. *s.* (from *segregate*.) Separation from others (*Shakspeare*).

SEGUE, in the Italian music, is often found before aria, alleluja, amen, &c. to show that those portions or parts are to be sung immediately after the last note of that part over which it is written; but if these words, si placet, or ad libitum, are joined therewith, it signifies that these portions may be sung or not, at pleasure.

SEGUIERIA, in botany, a genus of the class polyandria, order monogynia. Calyx five-leaved; corolless; capsule one-seeded, with a large terminal wing and small lateral ones. Two species; one a South American shrub, climbing, with recurved prickles, white fetid flowers; the other a native of Cochinchina.

SEGURA, a river of Spain, which rises in the mountains of Segura, in Murcia, crosses that province and the S. part of Valencia, and enters the Mediterranean, at Guardaman.

SEGURA, a town of Spain, in Murcia, seated among mountains, 34 miles N.E. of Ubeda, and 96 W.N.W. of Murcia.

SEGURA, a town of Spain, in Arragon, 35 miles S.E. of Calatajud, and 38 N. of Teruel.

SEGURA, a town of Portugal, in Beira, with a fort on a mountain. It stands on the frontiers of Spain, 15 miles W.N.W. of Alcantara, and 35 E.S.E. of Castel Branco.

SEIGNETTE'S SALT. This neutral salt, which consists of soda and tartareous acid, was prepared and made known by a Frenchman named Peter Seignette, towards the end of the 17th century. The confidence with which the

inventor recommended it, and the care he took to conceal the method of making it, had, as is usual, such an effect, that it was employed in preference to many other medicines long known, which had been equally serviceable; and by these means, without much trouble, he was enabled to acquire a fortune. It must, however, be allowed, that he was a skilful chemist, who, by his writings, and the invention of various other medicines, had obtained considerable reputation as a physician and naturalist. He was established as an apothecary at Rochelle; published papers on various natural objects which he had observed in his neighbourhood, in the memoirs of the Academy of Sciences at Paris, as well as in other works; and died on the 11th of March 1719.

He recommended this salt, which enriched him, and rendered his name famous, in some small treatises, printed in particular about the year 1762. He called it sometimes alkaline salt, sometimes sal polycrest, and sometimes Rochelle salt. After his death, his son continued to prepare and to vend it with the greatest success.

Seignette discovered sal polycrest while he was engaged in making soluble tartar, tartrite of potash, and, according to the old opinion, imagining that both the fixed alkalies were the same, used soda instead of potash. By this means he procured, not without surprise, a salt different from the common soluble tartar which he wished to prepare, and from the other well-known salt also. He was induced, therefore, to examine it. The experiments of learned chemists discovered the component parts of this salt. The mode of preparing it was then made publicly known; and, by more accurate examination, the difference, before overlooked, between vegetable and mineral alkali, was determined; by which new light was thrown upon chemistry, and an important service rendered to a variety of arts.

Among those who contributed to bring this salt into repute, was Nicolas Lemery, to whom Seignette sent a large quantity of it, which he distributed at Paris, though unacquainted with its component parts. Its composition was discovered at the same time, about the year 1731, by two French chemists, Balduc and Geoffroy, the former published his observations in the memoirs of the Academy of Sciences; and the latter communicated his to sir Hans Sloane, who caused them to be printed in the Philosophical Transactions. Newman, therefore, was not the first who made known the composition of Seignette's salt, in his treatise on saltpetre; for Newman's sal polycrest is essentially different; and he himself confesses that he was not acquainted with the Rochelle salt.

SEJANUS (Ælius), a native of Vulsinum in Tuscany, who distinguished himself in the court of Tiberius. Sejanus attached himself to the interest and the views of Tiberius, who then sat on the imperial throne. The emperor, though naturally suspicious, was free and open with Sejanus, and communicated to him his greatest secrets. Sejanus improved this confidence, and he next endeavoured to become the favourite of the soldiers and the darling of the senate. His affability gained him the hearts of the soldiers, and by appointing his own favourites to places of trust, all the officers and centurions of the army became devoted to his interest. His views, however, of aspiring to the imperial throne were finally discovered, both by the people and the emperor; and being at length deserted by all his pretended friends, the man who aspired to the empire, and who called himself the favourite of the people, the darling of the prætorian guards, and the companion of Tiberius, was seized without resistance, and the same day strangled in prison, A. D. 31. His remains were exposed to the fury of the populace, and afterwards thrown into the Tiber. His children and all his relations were involved in the ruin.

SEIGNEU'RIAL. *a.* (from *seignior*.) Invested with large powers; independant (*Temple*).

SE'IGNIOR. *s.* (from *senior*, Latin; *seigneur*, French.) A lord. The title of honour given by Italians.

SE'IGNIORY. *s.* (*seigneurie*, French; from *seignior*.) A lordship; a territory (*Spenser*).

SE'IGNORAGE. *s.* (*seigneuriage*, French; from *seignior*.) Authority; acknowledgment of power (*Locke*).

SEIGNIOR is, in its general signification, the same with lord; but is particularly used for the lord of the fee, as of a manor, as seigneur among the feudists is he who grants a fee or benefit out of the land to another; and the reason is, because, having granted away the use and profit of the land, the property or dominion he still retains in himself.

SEIGNIORAGE, is a royalty or prerogative of the king, whereby he claims an allowance of gold and silver bought in the mass to be exchanged for coin. As seigniorage, out of every pound weight of gold, the king had for his coin 5s. of which he paid to the master of the mint sometimes 1s. and sometimes 1s. and 6d. Upon every pound weight of silver, the seigniorage allowed to the king in the time of Edward III. was 18 penny-weights, which then amounted to about 1s. out of which he sometimes paid 8d. at others 9d. to the master. In the reign of king Henry V. the king's seigniorage of every pound of silver was 15d. &c.

SEIGNIORY, is borrowed from the French *seigneurie*, i. e. *dominatus*, *imperium*, *principatus*; and signifies with us a manor or lordship, *seigniory de sokemans*. *Seigniory in gross*, seems to be the title of him who is not lord by means of any manor, but immediately in his own person; as *tenure in capite*, whereby one holds of the king as of his crown, is seigniory in gross.

SEI'GNORISE. *v. a.* (from *seignior*.) To lord over (*Fairfax*).

SEIKS, or SICQUES, a powerful nation of Hindustan Proper, consisting of several small independant states, that have formed a kind of federal union. They possess the whole of Lahore, the principal part of Moultan, and the

W. part of Delhi. This tract extends 400 miles from N.W. to S.E. and is from 150 to 200 broad, in general; but the part between Attock and Behker cannot be less than 320. The founder of their sect was named Nanock, and lived in the beginning of the 16th century. They are the descendants of his disciples: the word seiks, in the Sanscrit language, signifying disciples. They are in general strong and well made, accustomed from their infancy to the most laborious life, and hardest fare. A pair of long blue drawers, and a kind of checquered plaid, a part of which is fastened round the waist, and the other thrown over the shoulder, form their clothing and equipage. The chiefs are distinguished by wearing some heavy gold bracelets on their wrists, and sometimes a chain of the same metal round their turbans, and by being mounted on better horses; otherwise no distinction appears among them. The civil and military government of the Seiks, before a common interest had ceased to actuate its operations, was conducted by general assemblies. The army met in a grand convention called Goorimotta, and transacted the most important affairs; such as declaring war or peace, forming alliances, or settling the necessary contributions: but since their dominions have been so widely extended, the grand assembly is now rarely summoned. Their army consists almost entirely of horse, of which a Seik will boast they can bring 300,000 into the field; and it is supposed they might bring 200,000. They have commonly two, and some of them three horses each. They, indeed, consider this animal as necessary to their existence; and though it is customary with them to make merry on the demise of one of their brethren, they mourn for the death of a horse. The Seiks, like the Hindoos, are perfectly tolerant in matters of faith, and require only a conformity in certain signs and ceremonies; but, unlike the Hindoos, they admit proselytes; although those from among the Mahometans are the least esteemed. The Seiks are now become one of the most powerful states in Hindustan. Their capital is Lahore.

SEINE, a river of France, which rises in the department of Côte d'Or, and flowing by Troyes, Melun, Paris, and Rouen, falls into the English Channel, at Havre de Grace.

SEINE (Lower), a department of France, including part of the late province of Normandy. Rouen is the capital.

SEINE AND MARNE, a department of France, including part of the late province of the Isle of France. Meaux is the capital.

SEINE AND OISE, a department of France, including part of the late province of the Isle of France. Versailles is the capital.

SEINE. *s.* (segne, Saxon.) A net used in fishing (*Carew*).

SEINER. *s.* (from *seine*.) A fisher with nets (*Carew*).

SEINSHEIM, a town of Franconia, with a castle, 33 miles N.W. of Nuremburg. Lon. 10. 28 E. Lat. 49. 40 N.

SEIR, or HOR, a mountain in Arabia Petræa, which formerly bounded Judea on the S. and separated it from Idumea. It is now called Sardeny, and is 140 miles E. of Cairo, in Egypt.

SEISIN, in law, signifies possession. In this sense we say, *premier seisin*, for the first possession, &c. Seisin is divided into that in deed or in fact, and that in law. A seisin in deed is where a possession is actually taken: but a seisin in law is, where lands descend, and the party has not entered thereon; or, in other words, it is where a person has a right to lands, &c. and is by wrong disseised of them. A seisin in law is held to be sufficient to avow on; though to the bringing of an assize, actual seisin is required; and where seisin is alleged, the person pleading it must show of what estate he is seised, &c. Seisin of a superior service is deemed to be a seisin of all superior and casual services that are incident thereto; and seisin of a lessee for years, is sufficient for him in reversion.

SEISIN (Livery of), in law, an essential ceremony in the conveyance of landed property; being no other than the pure feodal investiture, or delivery of corporal possession of the land or tenement. This was held absolutely necessary to complete the donation; *Nam feudum sine investitura nullo modo constitui potuit:* and an estate was then only perfect when, as Fleta expresses it in our law, *sit juris et seisinæ conjunctio.* See FEOFFMENT.

SEISIS. (from σεισω, to shake.) In medicine, concussion.

To SEIZE. *v. a.* (*saiser*, French.) 1. To take hold of; to gripe; to grasp (*Milton*). 2. To take possession of by force (*Milton*). 3. To take possession of; to lay hold on; to invade suddenly (*Pope*). 4. To take forcible possession of by law (*Camden*). 5. To make possessed (*Addison*).

To SEIZE. *v. n.* To fix the grasp or the power on any thing (*Shakspeare*).

SEIZURE. *s.* (from *seize*.) 1. The act of seizing. 2. The thing seized (*Milton*). 3. The act of taking forcible possession (*Swift*). 4. Gripe; possession (*Dryden*). 5. Catch (*Watts*).

SELAGO. In botany, a genus of the class didynamia, order gymnospermia. Calyx four-cleft; tube of the corol capillary, with a nearly equal border; one or two-seeded. Twenty species, all natives of the Cape. The following are cultivated.

1. S. corymbosa. Fine-leaved selago. Rising, with a slender woody stem that requires support, seven or eight feet high, and small white flowers appearing in July and August.

2. S. spuria. Linear-leaved selago. Stem suffruticose, leaves alternate, clustered; corol five-cleft, violet. A biennial; flowering in June.

3. S. ovata. Ovate-headed selago. Bearing white flowers, with a yellow spot on the two uppermost segments, and sometimes on all of them, and an orange spot on the mouth of the tube; very fragrant: flowers in June and July. These may be increased by cuttings or

layers; to be treated afterwards as the hardier sort of green-house plants.

SELAM, a town of Mexico, in the province of Jucatan, situate near the sea-coast, 45 miles N.W. of Merida. Lon. 90. 28 W. Lat. 39. 12 N.

SELBY, a town in the W. riding of Yorkshire, with a market on Monday, seated on the Ouse, 12 miles S. of York, and 182 N. by W. of London. Lon. 1. 2 W. Lat. 53. 47 N.

SE'LCOUTH. *a.* (selb, rare, Saxon; and *couth*, known.) Uncommon (*Spenser*).

SELDEN (John), called by Grotius, the glory of England, was born at Salvington, in Sussex, in 1584. He was educated at the free school at Chichester; whence he was sent to Hart-hall, in the university of Oxford, where he staid four years. In 1612, he entered himself in Clifford's-inn, in order to study the law; and, about two years after, removed to the Inner Temple, where he soon acquired great reputation by his learning. He had already published several of his works; and this year wrote verses in Latin, Greek, and English, upon Mr. William Browne's Britannia's Pastorals. In 1614, he published his Titles of Honour; and in 1616, his Notes on sir John Fortescue's book, De Laudibus Legum Anglie.

In 1618, he published his History of Tythes; which gave great offence to the clergy, and was animadverted upon by several writers; and for that book he was called before the high commission court, and obliged to make a public acknowledgment of his sorrow for having published it. In 1621, being sent for by the parliament, though he was not then a member of that house, and giving his opinion very strongly in favour of their privileges in opposition to the court, he was committed to the custody of the sheriff of London, but was set at liberty after five weeks confinement. In 1623, he was chosen burgess for Lancaster; but, amidst all the divisions of the nation, kept himself neuter, prosecuting his studies with such application, that though he was the next year chosen reader of Lyon's-inn, he refused to perform that office. In 1625, he was chosen burgess for Great Bedwin, in Wiltshire, to serve in the first parliament of king Charles I. in which he declared himself warmly against the duke of Buckingham; and on his grace's being impeached by the house of commons, was appointed one of the managers of the articles against him. In 1627 and 1628, he opposed the court party with great vigour. The parliament being prorogued till January 20, 1629, Mr. Selden retired to the earl of Kent's house at Wrest, in Bedfordshire, where he finished his Marmora Arundeliana. The parliament being met, he, among others, again distinguished himself by his zeal against the court; when the king, dissolving the parliament, ordered several of the members to be brought before the King's-bench bar, and committed to the Tower. Among these was Mr. Selden, who, insisting on the benefit of the laws, and refusing to make his submission, was removed to the King's-bench prison. Being here in danger of his life, on account of the plague then raging in Southwark, he petitioned the lord high treasurer, at the end of Trinity-term, to intercede with his majesty that he might be removed to the Gate-house, Westminster, which was granted: but, in Michaelmas term following, the judges objecting to the lord treasurer's warrant, by which he had been removed to the Gate-house, an order was made for conveying him back to the King's-bench, whence he was released in the latter end of the same year; but, fifteen years after, the parliament ordered him 5000*l.* for the losses he had sustained on this occasion. He was afterwards committed, with several other gentlemen, for dispersing a libel; but the author, who was abroad, being discovered, they were at length set at liberty. In 1634, a dispute arising between the English and Dutch, concerning the herring-fishery on the British coast, he was prevailed upon, by archbishop Laud, to draw up his Mare Clausum, in answer to Grotius's Mare Liberum: which greatly recommended him to the favour of the court. In 1640, he was chosen member for the university of Oxford; when he again opposed the court, though he might, by complying, have raised himself to very considerable posts. In 1643, he was appointed one of the lay-members to sit in the assembly of divines at Westminster, and was the same year appointed keeper of the records in the Tower. Whilst he attended his duty in the assembly, a warm debate arose respecting the distance of Jericho from Jerusalem. The party which contended for the shortest distance, urged, as a proof of their opinion being well founded, that fishes were carried from the one city to the other, and sold in the market. Their adversaries were ready to yield to the force of this conclusive argument, when Selden, who despised both parties, as well as the frivolousness of their dispute, exclaimed, "Perhaps the fishes were salted!" This unexpected remark left the victory doubtful, and renewed the debate; and our author, who was sick of such trifling, soon found employment more suited to his genius; for, in 1645, he was made one of the commissioners of the admiralty. The same year he was unanimously elected master of Trinity-college, Cambridge; but declined accepting. He died in 1654; and was interred in the Temple church, where a monument is erected to his memory. Dr. Wilkes observes, that he was a man of uncommon gravity and greatness of soul, averse to flattery, liberal to scholars, charitable to the poor; and though he had great latitude in his principles with regard to ecclesiastical power, yet he had a sincere regard for the church of England. He wrote many learned works besides those already mentioned; the principal of which are, 1. De Jure Naturali et Gentium juxta Disciplinam Hebræorum. 2. De Nuptiis et Divorciis. 3. De Anno Civili veterum Hebræorum. 4. De Nummis. 5. De Diis Syris. 6. Uxor Hebraica. 7. Jani Anglorum Facies altera, &c.

All his works were printed together in 1726, in 3 vols. folio.

SE'LDOM. *ad.* (rel̃ban, Sax. *selden*, Dut.) Rarely; not often; not frequently (*South*).

SE'LDOMNESS. *s.* (from *seldom.*) Uncommonness; infrequency; rareness; rarity.

SE'LDSHOWN. *a.* (*seld* and *shown.*) Seldom exhibited to view (*Shakspeare*).

To SELE'CT. *v. a.* (*selectus*, Lat.). To choose in preference to others rejected (*Knol.*).

SELE'CT. *a.* Nicely chosen; choice; culled out on account of superior excellence (*Prior*).

SELE'CTION. *s.* (*selectio*, Lat.) The act of culling or choosing; choice (*Brown*).

SELE'CTNESS. *s.* (from *select.*) The state of being select.

SELE'CTOR. *s.* (from *select.*) He who selects.

SELENITE. SELENITIC SPAR, in mineralogy. See GYPSUM.

SELENOGRA'PHICAL. SELENOGRA'PHIC. *a.* (*selenographique*, Fr.) Belonging to selenography.

SELENO'GRAPHY. *s.* (σελήνη and γράφω.) A description of the moon (*Brown*).

SELESHIA, anciently SELEUCIA, a town of Turkey in Asia, in Caramania, 10 miles from the sea, and 58 W. of Terasso.

SELEUCIA ILBER, an ancient episcopal town of Syria, seated on the sea-coast, eight miles N. of Antioch.

SELEUCIDÆ, a sirname given to those monarchs who sat on the throne of Syria, founded by Seleucus the son of Antiochus, from whom the word is derived. The era of the Seleucidæ begins with the taking of Babylon by Seleucus, B. C. 312, and ends at the conquest of Syria by Pompey, B. C. 65.

SELEUCIS, a division of Syria. It received its name from Seleucus, who was the founder of the Syrian empire, after the death of Alexander the Great.

SELEUCUS, 1st, one of the captains of Alexander the Great, sirnamed Nicator or Victorious, was son of Antiochus. After the king's death he received Babylon as his province. When he had strengthened himself in his empire, Seleucus imitated the example of the rest of the generals of Alexander, and assumed the title of independent monarch. He was at last murdered by one of his servants called Ptolemy Ceraunus, a man on whom he bestowed the greatest favours. He founded no less than 34 cities in different parts of his empire, which he peopled with Greek colonies, whose national industry, learning, &c. were communicated to the indolent inhabitants of Asia. Seleucus was murdered 280 years before the Christian era, in the 32d year of his reign, and the 78th, or according to others, the 73d year of his age. He was succeeded by Antiochus Soter.—The 2d, sirnamed Callinicus, succeeded his father Antiochus Theus on the throne of Syria. After he had been a prisoner for some time in Parthia, he died of a fall from his horse, B. C. 226, after a reign of 20 years. Seleucus had received the sirname of Pogon, from his long beard, and that of Callinicus, ironically to express his very unfortunate reign. —The 3d, succeeded his father Seleucus 2d, on the throne of Syria, and received the sirname of Ceraunus, by antiphrasis, as he was a very weak, timid monarch. He was murdered by two of his officers after a reign of three years, B. C. 223, and his brother Antiochus, though only fifteen years old, ascended the throne, and rendered himself so celebrated, that he acquired the name of the Great (*Appian*).—The 4th, succeeded his father Antiochus the Great, on the throne of Syria. He was sirnamed Philopator, or according to Josephus, Soter. He was poisoned after a reign of 12 years, B. C. 175. (*Strab. Justin.*).—The 5th, succeeded his father Demetrius Nicator on the throne of Syria, in the 20th year of his age. He was put to death in the first year of his reign, by Cleopatra his mother. He is not reckoned by many historians in the number of the Assyrian monarchs.—The 6th, one of the Seleucidæ, son of Antiochus Gryphus, was banished from his kingdom by Antiochus Pius, and fled to Cilicia, where he was burnt in a palace by the inhabitants, B. C. 93.

SELF. *pronoun.* plural *selves.* (ſylf, ſylfa, Saxon; *self*, *selve*, Dutch.) 1. Its primary signification seems to be that of an adjective: very; particular; this above others (*Dryden*). 2. It is united both to the personal pronouns, and to the neutral pronoun *it*, and is always added when they are used reciprocally; as, *I did not hurt* him, *he hurt* himself; *the people hiss* me, *but I clap* myself (*Locke*). 3. Compounded with *him*, a pronoun substantive, *self* is in appearance an adjective: joined to *my*, *thy*, *our*, *your*, pronoun adjectives, it seems a substantive. 4. It is much used in composition; as *self*-love, *self*-evident, *self*-confiding.

SELF-HEAL, in botany. See PRUNELLA.

SELF-MURDER. See SUICIDE.

SE'LFISH. *a.* (from *self.*) Attentive only to one's own interest; void of regard for others.

SE'LFISHNESS. *s.* (from *selfish*). Attention to his own interest, without any regard to others; self-love (*Boyle*).

SE'LFISHLY. *ad.* (from *selfish.*) With regard only to his own interest; without love of others (*Pope*).

SE'LFSAME. *a.* (*self* and *same*). Exactly the same (*Milton*).

SELIGENSTADT, a town of Germany, in the electorate of Mentz, formerly imperial. It is seated at the confluence of the Gernspentz and Maine, 14 miles E. of Francfort, and 27 E. of Mentz. Lon. 8. 32 E. Lat. 49. 54 N.

SELINE. A disease of the nails in which white spots are occasionally seen in their substance.

SELINUNS, or SELINUS, a town on the southern parts of Sicily, founded A. U. C. 127, by a colony from Megara. It received its name from σέλινον, parsley, which grew there in abundance.

SELINUM. Parsley. In botany, a genus of the class pentandria, order digynia. Involucre reflected, fruit oval-oblong, compressed,

striate down the middle; petals heart-shaped, inflected, uniform, calyx entire. Nine species, some herbaceous and some suffruticose, natives, for the most part, of the south of France; one only, selinum palustre, common to our own country, and found in marshy places. It is called parsley from the resemblance of its leaves to apium genus.

SE'LION. *s.* (*selio*, low Latin.) A ridge of land (*Ainsworth*).

SELIVREA, a town of Turkey in Europe, in Romania, with an archbishop's see. It was a large place, but is now much decayed. It is seated on the sea of Marmora, 35 miles W. of Constantinople. Lon. 28. 12 E. Lat. 41. 4 N.

SELKIRK (Alexander), whose adventures gave rise to a well known and most admirable historical romance, was born at Largo, in the county of Fife, about the year 1676, and was bred a seaman. He went from England, in 1703, in the capacity of sailing-master of a small vessel called the Cinque-Ports galley, Charles Pickering captain, burthen about 90 tons, with 16 guns, and 63 men; and in September the same year sailed from Cork, in company with another ship of 26 guns, and 120 men, called the St. George, commanded by that famous navigator William Dampier, intending to cruize on the Spaniards in the South Sea. On the coast of Brazil, Pickering died, and was succeeded in his command by his lieutenant Thomas Stradling. They proceeded on their voyage round Cape Horn to the island of Juan Fernandes, whence they were driven by the appearance of two French ships of 36 guns each, and left five of Stradling's men there on shore, who were taken off by the French. Hence they sailed to the coast of America, where Dampier and Stradling quarrelled, and separated by agreement, on the 19th of May, 1704. In September following, Stradling came again to the island of Juan Fernandes, where Selkirk and his captain had a difference, which, with the circumstance of the ship's being very leaky, and in bad condition, induced him to determine on staying there alone; but when his companions were about to depart, his resolution was shaken, and he desired to be taken on board again. The captain, however, refused to admit him, and he was obliged to remain, having nothing but his clothes, bedding, a gun, and a small quantity of powder and ball; a hatchet, knife, and kettle; his books, and mathematical and nautical instruments. He kept up his spirits tolerably till he saw the vessel put off, when (as he afterwards related) his heart yearned within him, and melted at parting with his comrades and all human society at once.

Thus left sole monarch of the island, with plenty of the necessaries of life, he found himself in a situation hardly supportable. He had fish, goat's flesh, turnips, and other vegetables; yet he grew dejected, languid, and melancholy, to such a degree as to be scarce able to refrain from doing violence to himself. Eighteen months passed before he could, by reasoning, reading his Bible, and study, be thoroughly reconciled to his condition. At length he grew happy, employing himself in decorating his huts, chasing the goats, whom he equalled in speed, and scarcely ever failed of catching. He also tamed young kids, laming them to prevent their becoming wild; and he kept a guard of tame cats about him, to defend him when asleep from the rats, who were very troublesome. When his clothes were worn out, he made others of goats skins, but could not succeed in making shoes, the use of which, however, habit, in time, enabled him to dispense. His only liquor was water. He computed that he had caught 1000 goats during his abode in the island; of which he had let go 500, after marking them by slitting their ears. Commodore Anson's people, who were there about 30 years after, found the first goat which they shot upon landing was thus marked, and as it appeared to be very old, concluded that it had been under the power of Selkirk. But it appears by captain Carteret's account of his voyage in the Swallow sloop, that other persons practised this mode of marking, as he found a goat with his ears thus slit, on the neighbouring island of Mas-a-fuera, where Selkirk never was. He made companions of his tame goats and cats, often dancing and singing with them. Though he constantly performed his devotions at stated hours, and read aloud, yet, when he was taken off the island, his language, from disuse of conversation was become scarcely intelligible. In this solitude, he continued four years and four months; during which time only two incidents happened which he thought worth relating, the occurrences of every day being in his circumstances nearly similar. The one was, that pursuing a goat eagerly, he caught it just on the edge of a precipice, which was covered with bushes, so that he did not perceive it, and he fell to the bottom, where he lay (according to captain Rogers's account) 24 hours senseless; but, as he related to Sir R. Steele, he computed, by the alteration of the moon, that he had lain three days. When he came to himself, he found the goat lying under him dead. It was with great difficulty that he could crawl to his habitation, whence he was unable to stir for ten days, and did not recover of his bruises for a long time. The other event was the arrival of a ship, which he at first supposed to be French: and such is the natural love of society in the human mind, that he was eager to abandon his solitary felicity, and surrender himself to them, although enemies; but upon their landing, approaching them, he found them to be Spaniards, of whom he had too great a dread to trust himself in their hands. They were by this time so near that it required all his agility to escape, which he effected by climbing into a thick tree, being shot at several times as he ran off. Fortunately the Spaniards did not discover him, though they stayed some time under the tree where he was hid, and killed some goats just by. In this solitude Selkirk remained until the 2d of February 1709, when he saw two ships come into the bay, and knew them to be English. He

immediately lighted a fire as a signal; and on their coming on shore, found they were the Duke, captain Rogers, and the Duchess, captain Courtney, two privateers from Bristol. He gave them the best entertainment he could afford; and, as they had been a long time at sea without fresh provisions, the goats which he caught were highly acceptable. His habitation consisting of two huts, one to sleep in, the other to dress his food in, was so obscurely situated, and so difficult of access, that only one of the ship's officers would accompany him to it. Dampier, who was pilot on board the Duke, and knew Selkirk very well, told captain Rogers, that, when on board the Cinque-Ports, he was the best seaman on board that vessel; upon which captain Rogers appointed him master's mate of the Duke. After a fortnight's stay at Juan Fernandes, the ships proceeded on their cruize against the Spaniards; plundered a town on the coast of Peru; took a Manilla ship off California; and returned by way of the East Indies to England, where they arrived the 1st of October 1711; Selkirk having been absent eight years, more than half of which time he had spent alone in the island. The public curiosity being excited respecting him, he was induced to put his papers into the hands of Defoe, to arrange and form them into a regular narrative. These papers must have been drawn up after he left Juan Fernandes, as he had no means of recording his transactions there. Captain Cook remarks, as an extraordinary circumstance, that he had contrived to keep an account of the days of the week and month: but this might be done, as Defoe makes Robinson Crusoe do, by cutting notches in a post, or many other methods. From this account of Selkirk, Defoe took the idea of writing a more extensive work, the romance of Robinson Crusoe, and very dishonestly defrauded the original proprietor of his share of the profits. Of the time or place or manner of this extraordinary man's death we have received no account; but in 1792 the chest and musket which Selkirk had with him on the island were in the possession of his grand nephew, John Selkirk, weaver, in Largo, where doubtless they are at present. A very interesting and authentic account of Selkirk was published about 12 years ago, in a duodecimo volume, by Mr. Isaac James, of Bristol.

SELKIRK, a borough of Scotland, and the county-town of Selkirkshire. It has a manufacture of boots and shoes, and is seated on the Ettrick, 30 miles S. of Edinburgh. Lon. 2. 46 W. Lat. 55. 26 N.

SELKIRKSHIRE, a county of Scotland, bounded on the N. by Edinburghshire, on the E. by Roxburghshire, on the S. by Dumfriesshire, and on the W. by Peebleshire. It is a hilly country, 20 miles long, and 10 where broadest. The number of inhabitants in 1801 was 5070. The chief rivers are the Tweed, Ettrick, Yarrow, and Gela.

SELL. *pronoun.* (for *self.*) (*Ben Jonson.*)

SELL. *s.* (*selle*, Fr.; *sella*, Lat.) A saddle: obsolete (*Spenser*).

To SELL. *v. a.* (ỳllan, Saxon.) To give for a price; to vend (*Swift*).

To SELL. *v. n.* To have commerce or traffic with one (*Shakspeare*).

SELLA TURCICA. (*sella*, a saddle, *quasi sedda*, from *sedeo*, to sit, and *turcica*; from its supposed resemblance to a Turkish saddle.) Ephippium A cavity in the sphænoid bone, containing the pituitary gland, surrounded by the four clinoid processes.

SE'LLANDER. *s.* A dry scab in a horse's hough or pastern (*Ainsworth*).

SE'LLER. *s.* (from *sell.*) The person that sells; vender (*Shakspeare*).

SELTZER, or LOWER SELTZER, a town of Germany, in the late archbishopric of Treves; celebrated for a spring of mineral water, which is exported in great quantities. It is situate on the Elmsbach, 30 miles E. of Coblentz.

SELTZER WATER. A saline water, slightly alkaline, highly acidulated with carbonic acid, containing more of this volatile principle than is sufficient to saturate the alkali, and the earths which it holds in solution. It is particularly serviceable in relieving some of the symptoms that indicate a morbid affection of the lungs; in slow hectic fever, exanthematous eruptions of the skin, foulness of the stomach, bilious vomiting, acidity and heart-burn, spasmodic pains in any part of the alimentary canal, and bloody or highly offensive stools. On account of its property in relieving spasmodic pains, and from its rapid determination to the kidneys, and perhaps its alkaline contents, it has been sometimes employed with great advantage in diseases of the urinary organs, especially those that are attended with the formation of calculus. A large proportion of the Seltzer water, either genuine or artificial, that is consumed in this country, is for the relief of these disorders. Even in gonorrhœa, either simple or venereal, Hoffman asserts that advantage is to be derived from this medicine. The usual dose is from half a pint to a pint. See MINERAL WATERS.

SE'LVAGE. *s.* The edge of cloth where it is closed by complicating the threads (*Exodus*).

SELVES. The plural of *self.*

SEMASIA. (from σημαινω, to denote.) The first attack or access of a disease.

SE'MBLABLE. *a.* (*semblable*, Fr.) Like; resembling (*Shakspeare*).

SE'MBLABLY. *ad.* (from *semblable.*) With resemblance (*Shakspeare*).

SE'MBLANCE. *s.* (*semblance*, Fr.) 1. Likeness; resemblance; similitude; representation (*Rogers*). 2. Appearance; show; figure.

SE'MBLANT. *a.* (*semblant*, Fr.) Like; resembling; having the appearance of any thing: little used (*Prior*).

SE'MBLANT. *s.* Show; figure; resemblance; representation: not in use (*Spenser*).

SE'MBLATIVE. *a.* (from *semblant.*) Suitable; accommodate; fit; resembling (*Shak.*).

To SE'MBLE. *v. n.* (*sembler*, French.) To represent; to make a likeness (*Prior*).

SEMBLIS, in the entomology of Fabricius a tribe in the genus PHRYGANEA, as also in the genus HEMEROBUS: which see.

SEMECARPUS, in botany, a genus of the class pentandria, order trigynia. Calyx inferior, five-cleft; nut kidney-form, seated on a large, fleshy, depressed receptacle. One species only, semecarpus anacardium, an East Indian tree, with numerous branches; leaves alternate, wedge-form, very entire; raceme terminal, erect, peduncled; receptacle pear-shaped; nut covered with a shell, spongy between the skins, and filled with a black caustic juice, used for marking linen.

SEMELE, a daughter of Cadmus by Hermione, was beloved by Jupiter; but Juno, always jealous of her husband, determined to punish her rival. She borrowed the girdle of Ate, which contained every wickedness, and, in the form of Beroe, Semele's nurse, visited the house of Semele, who listened with attention to the false Beroe, and was persuaded to entreat her lover to come to her arms with the same majesty as he approached Juno. Jupiter had sworn by the Styx to grant Semele whatever she required, he therefore came to her bed attended by the clouds, the lightning, and thunderbolts. Semele could not endure so much majesty, and she was instantly consumed with fire. The child, however, of which she was pregnant, was saved from the flames by Mercury, and Jupiter placed him in his thigh the rest of the time which he ought to have been in his mother's womb. This child was called Bacchus, or Dionysius. Semele immediately after death was honoured with immortality under the name of Thyone.

SEMEIOSIS. (*σεμειωσις*; from *σημειοω*, to notify.) See SEMIOTICE.

SEMEN, in physiology. See SEMINATION.

SEMEN ADJUWAEN. A seed imported from the East, of a pleasant smell, a grateful aromatic taste, somewhat like savory. It possesses exciting, stimulating, and carminative virtues, and is given in the East in nervous weakness, dyspepsia, flatulency, and heartburn.

SEMEN AGAVE. An East Indian seed, exhibited there in atonic gout.

SEMEN CONTRA. See SANTONICUM.

SEMEN SANCTUM. See SANTONICUM.

SEMI. (from *ημισυ*.) Semis, in composition universally signifies half, as *semicupium*, a half-bath, or bath up to the navel; *semilunaris*, in the shape of a half-moon, *semicircle*, half a circle.

SEMIA'NNULAR. *a.* (*semi* and *annulus*, a ring.) Half round (*Grew*).

SEMIBREVE. In music, a note of the fourth degree of length, reckoning from the *large*. The longest note now in common use. Half a breve. The semibreve is now made round, but was anciently in the form of a lozenge. It was divided into major and minor: the major was equal to two-thirds of the perfect breve, and the minor to one-third. This character being originally the note of least power in point of length, was indivisible, and only considered as a portion of the *large*, or the *long*. At present it is the standard by which all the notes of lesser value are measured.

SEMICIRCLE, in geometry, half a circle, or that figure comprehended between the diameter of a circle and half the circumference.

SEMICI'RCLED. SEMICI'RCULAR. *a.* (*semi* and *circular*.) Half round (*Addison*).

SEMICIRCULAR CANALS. In anatomy, these canals are three in number, and take their name from their figure. They belong to the organ of hearing, and are situated in the petrous portion of the temporal bone, and open into the vestibulum.

SEMICO'LON. *s.* (*semi* and *κωλον*.) Half a colon; a point made thus (;) to denote a greater pause than that of a comma.

SEMICUBICAL PARABOLA, a curve of the 2d order, of such a nature that the cubes of the ordinates are proportional to the squares of the abscisses. Its equation is $ay^2=x^3$. This curve is one of Newton's five diverging parabolas, being his 70th species; having a cusp at its vertex. It is otherwise named the Neilian parabola, from the name of the author who first treated of it.

The area of the space APM between the axis AP and the semiordinate PM, is $=\frac{4}{15}xy=\frac{4}{15}$AP × PM, or $\frac{4}{15}$ of the circumscribing rectangle.

The content of the solid generated by the revolution of the space APM about the axis AP, is $\frac{1}{4}pxy^2 = .7854$AP × PM^2, or $\frac{1}{4}$ of the circumscribing cylinder. And a circle equal to the surface of that solid may be found from the quadrature of an hyperbolic space.

Also the length of any arc AM of the curve may be easily obtained from the quadrature of a space contained under part of the curve of the common parabola, two semiordinates to the axis, and the part of the axis contained between them.

This curve may be described by a continued motion, viz. by fastening the angle of a square in the vertex of the common parabola; and then carrying the intersection of one side of this square and a long ruler (which ruler always moves perpendicularly to the axis of the parabola) along the curve of that parabola. For the intersection of the ruler, and the other side of the square will describe a semicubical parabola. Maclaurin performs this without a common parabola in his Geometria Organica.

SEMIDIAMETER, half the diameter, or a right line drawn from the centre of a circle, or sphere, to its circumference; being the same with what is otherwise called the radius. The distances, diameters, &c. of the heavenly bodies, are usually estimated by astronomers, in semidiameters of the earth; and the distances of the secondary planets from their respective primary ones, by semidiameters of the body of the primary planet.

Suppose the semidiameter of the earth to be unity, then the measures of the sun and larger planets will be nearly as follow. The semidiameter of

The Earth	1
The Sun	111.25
The Moon	0.27
Mercury	0.38
Venus	1.15
Mars	0.65
Jupiter	11.81

Saturn	-	-	9.77
Herschel	-	-	4.32

SEMI-DIAPASON. In music, an octave diminished by a minor-semitone.

SEMIDIAPHANEITY. *s.* (*semi* and *diaphaneity*.) Half transparency; imperfect transparency (*Boyle*).

SEMIDIAPHANOUS. *a.* (*semi* and *diaphanous*.) Half transparent (*Woodward*).

SEMIDIAPENTE. (from the Greek.) An imperfect fifth. See HEMIDIAPENTE.

SEMIDIATESSERON. A defective or false fifth.

SEMIDITONE. (from the Greek.) A lesser third. See HEMIDITONE: ratio 5 : 6.

SEMIDOUBLE. *s.* (*semi* and *double*.) In the Romish breviary, such offices and feasts as are celebrated with less solemnity than the double ones (*Bailey*).

SEMIFLOSCULE, in botany, a semifloret. Flos semifloculosus. A semifloculous flower, or a flower composed of semiflorets. These are terms of Tournefort's; and answer to the corollule and tied corol of Linnéus. Ray calls such compound flowers planipetali. Hence

SEMIFLOSCULOSÆ or SEMIFLOSCULOSI, the name of a sub-division in the order of compound flowers, both in the natural and artificial system of Linnéus: comprehending such as are made up wholly of fertile ligulate florets; as dandelion, lettuce, sowthistle, hawkweed, &c.

SEMIFLUID. *a.* (*semi* and *fluid*.) Imperfectly fluid (*Arbuthnot*).

SEMIGALLIA, the E. part of the duchy of Courland, separated by the river Mafza, from Courland Proper, and by the Dwina, from Russia, to which country it is now subject. Mittau is the capital.

SEMILUNAR. SEMILUNARY. *a.* (*semilunaire*, French.) Resembling in form a half moon (*Grew*).

SEMILUNAR VALVES. The three valves at the beginning of the pulmonary artery and aorta are so termed from their half-moon shape.

SEMIMEMBRANOSUS, in myology. This muscle arises from the outer surface of the tuberosity of the ischium, by a broad flat tendon which is three inches in length. From this tendon it has gotten the name of semimembranosus. It then begins to grow fleshy, and runs at first under the long head of the biceps, and afterwards between that muscle and the semi-tendinosus. At the lower part of the thigh it becomes narrower again, and terminates in a short tendon, which is inserted chiefly into the upper and back part of the head of the tibia, but some of its fibres are spread over the posterior surface of the capsular ligament of the knee. Between this capsular ligament and the tendon of the muscle we find a small bursa mucosa. The tendons of this and the last described muscle form the inner ham-string. This muscle bends the leg, and seems likewise to prevent the capsular ligament from being pinched.

SEMIMETAL. *s.* (*semi* and *metal*.) Half metal; imperfect metal (*Hill*).

SEMINAL. *a.* (*seminal*, Fr. *seminis*, Lat.) 1. Belonging to seed. 2. Contained in the seed; radical (*Swift*).

SEMINALITY. *s.* (from *semen*, Lat.) 1. The nature of seed (*Brown*). 2. The power of being produced (*Brown*).

SEMINARY. *s.* (*seminaire*, French, *seminarium*, Latin.) 1. The ground where any thing is sown to be afterward transplanted; seedplot (*Mortimer*). 2. The place or original stock whence any thing is brought (*Wood.*). 3. Seminal state (*Brown*). 4. Principle; causality (*Harvey*). 5. Breeding place; place of education, from which scholars are transplanted into life (*Swift*).

SEMINATION, in physiology, the first stage of the process of fecundation in animal or vegetable life, or that by which the sexual secretion of the male, denominated seed or semen, is communicated to the sexual organ of the female.

What is usually called the seed of a plant is by Linnéus termed its egg or ovum; and by which term soever described is, properly speaking, from the first the property of the female organ. It is produced and exists in the germ during the time of blooming, before fecundation takes place, and contains a very clear liquor, called by Malpighi the chorion. With this, in all probability, the fecundating particle of the farina or male secretion becomes mixed, and thus produces the embryon of the new plant. Koelreuter conceives, however, that the moisture of the stigma, which he supposes to be of an oleaginous nature, combines with the fluid of the male farina, and that both, in a conjoint form, are conveyed to the seed. Admitting this, however, to be true, various other changes take place in the seed sooner or later after fecundation has been produced: for in the neighbourhood of what is called the umbilicus or navel, and which afterwards constitutes the eye, a small vesicle appears filled with a peculiar liquid. The vesicle is termed sacculus colliquamenti, and the liquid it contains amnios. This vesicle grows larger, absorbs the chorion, which at last disappears, and finally forms the internal membrane of the seed. The amnios grows hard, and forms the cotyledons, or seed-leaves. As soon as the vesicle shows itself, the embryon becomes visible, which is, properly speaking, the corcle or heartlet. It is produced gradually, and may be traced in the sun-flower (helianthus annuus) three days after impregnation; in the cucumber a week after; in the meadow saffron (colchicum autumnale) not till some months after. It is at first soft, but in time it becomes, like the vesicle that contains it, of a larger size and firmer texture. The vesicle does not in all seeds increase in the same form. In some it grows larger in its whole circumference, in others it grows longer towards one extremity, and the sides afterwards become extended. The corcle or heartlet consists of two bodies; one sharp-pointed, called its rostel, which descends to the earth, and becomes a root, the other which is ascending and downy, called its plumele, which gives birth to the trunk and

branches. The seed is covered with a double integument, the outer thick and of a firm consistence, the inner transparent and tender.

With respect to number, plants are either furnished with one seed, as sea-pink and bistort; two, as wood-roof, and the umbelliferous plants; three, as spurge; four, as the lip-flowers of Tournefort, and rough-leaved plants of Ray; or many, as ranunculus, anemone, and poppy. The form of seeds is likewise extremely various, being either large or small, round, oval, heart-shaped, kidney-shaped, angular, prickly, rough, hairy, wrinkled, sleek, or shining, black, white, or brown. Most seeds have only one cell or internal cavity; those of lesser burdock, valerian, lamb's lettuce, cornelian cherry, and sebesten, have two. With respect to substance, seeds are either soft, membranaceous, or of a hard bony substance, as in gromwell, tamarind, and all the nuciferous plants. In point of magnitude, seeds are either very large, as in the cocoa-nut, or very small, as in campanula, ammannia, rampions, and throatwort.

With respect to situation, they are either dispersed promiscuously through the pulp (semina nidulentia), as in water-lily; affixed to a suture or joining of the valves of the seed-vessel, as in the cross-shaped and pea-bloom flowers; or placed upon a placenta or receptacle within the seed-vessel, as in tobacco and thorn-apple.

Seeds are said to be naked, (semina nuda) which are not contained in a cover or vessel. Such are those of the lip and compound flowers, the umbelliferous and rough-leaved plants; covered seeds (semina tecta) are contained in some vessel, whether of the capsule, pod, berry, apple, or cherry kind.

A simple seed is such as bears neither crown, wing, nor downy pappus; the varieties in seeds arising from these circumstances are particularly enumerated under their respective heads.

The fecundity of plants is frequently marvellous; from a single plant or stalk of Indian Turkey wheat are produced, in one summer, 2000 seeds; of elecampane 3000; of sun-flower 4000; of poppy 32,000; of a spike of cat's-tail 10,000, and upwards; a single fruit, or seed-vessel of tobacco, contains 1000 seeds; that of white poppy 8000. Mr. Ray relates, from experiments made by himself, that 1012 tobacco-seeds are equal in weight to one grain; and that the weight of the whole quantum of seeds in a single tobacco-plant is such as must, according to the above proportion, determine their number to be 360,000. The same author estimates the annual produce of a single stalk of spleenwort to be upwards of one million of seeds.

The dissemination of plants respects the different methods or vehicles by which nature has contrived to disperse their seeds for the purpose of increase. These by naturalists are generally reckoned four:

1. Rivers and running waters. 2. The wind 3. Animals. 4. An elastic spring, peculiar to the seeds themselves.

1. The seeds which are carried along by rivers and torrents are frequently conveyed many hundreds of leagues from their native soil, and cast upon a very different climate, to which, however, by degrees they render themselves familiar.

2. Those which are carried by the wind are either winged, as in fir-tree, trumpet-flower, tulip-tree, birch, arbor-vitæ, meadow-rue, and jessamine, and some umbelliferous plants; furnished with a pappus, or downy crown, as in valerian, poplar, reed, succulent swallow-wort, cotton-tree, and many of the compound flowers, placed within a winged calyx or seed-vessel, as in scabious, sea-pink, dock, dioscorea, ash, maple, and elm-trees, logwood, and woad; or, lastly, contained within a swelled calyx, or seed-vessel, as in winter-cherry, cucubalus, melilot, bladder-nut, fumitory, bladder-sena, heart-seed, and chick-peas.

3. Many birds swallow the seeds of vaneloe, juniper, misletoe, oats, millet, and other grasses, and void them entire. Squirrels, rats, parrots, and other animals, suffer many of the seeds which they devour to escape, and thus in effect disseminate them. Moles, ants, earth-worms, and other insects, by ploughing up the earth, admit a free passage to those seeds which have been scattered upon its surface. Again, some seeds attach themselves to animals, by means of hooks, crotchets, or hairs: which are either affixed to the seeds themselves, as in hound's-tongue, mouse-ear, vervain, carrot, bastard-parsley, sanicle, water-hemp, agrimony, arctopus, and verbesina; to their calyx, as in burdock, agrimony, rhexia, small wild bugloss, dock, nettle, pellitory, and lead-wort; or to their fruit or seed-vessel, as in liquorice, enchanter's night-shade, cross-wort, clivers, French honeysuckle, and arrow-headed grass.

4. The seeds which disperse themselves by an elastic force, have that force resident either in their calyx, as in oats, and the great number of ferns; in their pappus, as in centaurea crupina; or in their capsule, as in geranium, herb-bennet, African spiræ, fraxinella, horse-tail, balsam, Malabar-nut, cucumber, elaterium, and male balsam-apple.

The material termed seed *in animal physiology*, is a peculiar fluid; and, excepting in the human subject, has not hitherto been subjected to chemical analysis. Vauquelin published some account of this in 1791. This prolific liquor is secreted in the testicles, and carried through the epididymis and vas deferens into the vesiculæ seminales, to be emitted *sub coitu* into the female vagina, and there, by its aura, to penetrate and impregnate the ovulum in the female ovarium.

In castrated animals, and in eunuchs, the vesiculæ seminales are small, and contracted; and a little lymphatic liquor, but no semen, is found in them. The semen is detained for some time in the vesiculæ seminales, and rendered thicker from the continual absorption of its very thin part, by the oscula of the lymphatic vessels. In lascivious men, the semen is sometimes, though rarely, propelled by nocturnal pollution from the vesiculæ seminales,

though the ejaculatory ducts, (which arise from the vesiculæ seminales, perforate the urethra transversely, and open themselves by narrow and very nervous ostia at the sides of the caput gallinaginis) into the urethra, and from it to some distance. But in chaste men the greatest part is again gradually absorbed from the vesiculæ seminales through the lymphatic vessels, and conciliates strength of the body. The smell of semen is specific, heavy, affecting the nostrils, yet not disagreeable. The same odour is observed in the roots of the orchis, julæ of chesnuts, and the anthers of many plants. The smell of the semen of quadrupeds, when at heat, is so penetrating as to render their flesh fetid and useless, unless castrated. Thus the flesh of the stag, *tempore coitus*, is unfit to eat. The taste of semen is fatuous, and somewhat acrid. In the testes its consistence is thin and diluted; but in the vesiculæ seminales viscid, dense, and rather pellucid: and by venery and debility it is rendered thinner.

Specific gravity.—The greatest part of the semen sinks to the bottom in water, yet some part swims on its surface, which it covers like very fine threads mutually connected together in the form of a cobweb.

Colour of semen.—In the testicles it is somewhat yellow, and in the vesiculæ seminales it acquires a deeper hue. That emitted by pollution or coition becomes white from its mixture with the whitish liquor of the prostate gland during its passage through the urethra. In those people who labour under jaundice, and from the abuse of saffron, the semen has been seen yellow, and in an atrabiliary young man, black.

Quality.—Semen exposed to atmospheric air loses its pellucidity and becomes thick; but after a few hours it is again rendered more fluid and pellucid than it was immediately after its emission. This phenomenon cannot arise from water or oxygen attracted from the air. At length it deposits a phosphorated calx, and forms a corneous crust.

Experiments with semen prove that it turns the syrup of violets green, and dissolves earthy, mediate, and metallic salts. Fresh semen is insoluble in water, until it has undergone the above change in atmospheric air. It is dissolved by alkaline salts. By ætherial oil it is dried into a pellucid pellicle, like the cortex of the brain. It is dissolved by all acids, except the oxygenated acid of salt, by which it is coagulated in the form of white flakes. It is also acted upon by alkohol of wine.

By dry distillation semen gives out a small portion of empyreumatic oil, and volatile alkali. The remaining incinerated carbon affords soda and phosphorated calx.

The constituent principles of semen.—Chemical analysis demonstrates that one hundred parts of semen contain, 1. Of water, ninety parts. 2. Of animal gluten, six parts. 3. Of phosphorated calx, one part. 4. Of pure soda, three parts. 5. By microscopical examination, it is asserted that an immense number of very small animalcules with round tails, called spermatic animalcules, may be seen. 6. The odorous principle, which flies off immediately from fresh semen. It appears to consist of a peculiar vital principle, and by the ancients was called aura seminis.

Use of the semen.—1. Emitted into the female vagina *sub coitu*, it possesses the wonderful and stupendous power of impregnating the ovulum in the female ovarium. The odorous principle, or aura spermatica, appears to penetrate the cavity of the uterus, where it intermixes with a fluid of a congenial kind secreted by the female. The other principles of the semen oppear to be only a vehicle of the seminal aura. 2. In chaste men, the semen returning through the lymphatic vessels into the mass of the blood, gives strength to the body and mind; hence every animal languishes *post coitum*; and hence tabes dorsalis from onanism. 3. It is by the stimulus of the absorbed semen, at the age of puberty, into the mass of the humours; that the beard and hair of the pubes, but in animals the horns are produced; and the weeping voice of the boy changed into that of a man.

SEMINI'FICAL. Semini'fic. *a.* (*semen* and *facio*, Latin.) Productive of seed (*Brown*).

SEMINIFICA'TION. *s.* Propagation from the seed or seminal parts (*Hale*).

SEMIOPA'COUS. *a.* (*semi* and *opacus*, Lat.) Half dark (*Boyle*).

SEMIORBICULA'RIS ORIS. See Orbicularis oris.

SEMIORDINATE, of a conic section, &c. Half the ordinate.

SEMIPARABOLA, in the higher geometry, a curve defined by the equation $ax^{m-1} = y^m$; as $ax^2 = y^3$, and $ax^3 = y^4$. In semiparabolas, $y^m : v^m :: ax^{m-1} : az^{m-1} = x^{m-1} : z^{m-1}$; or the powers of the semiordinates are as the powers of the semiabscisses one degree lower; for instance, in cubical semiparabolas the cubes of the ordinates are as the squares of the abscisses; that is, $y^3 : v^3 :: x^2 : z^2$.

SEMIPELAGIANS, in ecclesiastical history, a name anciently, and even at this day, given to such as retain some tincture of Pelagianism. (See Pelagians.) Cassian, who had been a deacon of Constantinople, and was afterwards a priest at Marseilles, was the chief of these Semipelagians; whose leading principles were, 1. That God did not dispense his grace to one more than another in consequence of predestination, i. e. an eternal and absolute decree, but was willing to save all men, if they complied with the terms of his gospel. 2. That Christ died for all men. 3. That the grace purchased by Christ, and necessary to salvation, was offered to all men. 4. That man, before he received grace, was capable of faith and holy desires. 5. That man was born free, and was consequently capable of resisting the influences of grace, or of complying with its suggestion. The Semipelagians were very numerous; and the doctrine of Cassian, though variously explained, was received in the greatest part of the monastic schools in Gaul, from

whence it spread itself far and wide through the European provinces. As to the Greeks and other eastern Christians, they had embraced the Semipelagian doctrines before Cassian, and still adhere to them. In the 6th century, the controversy between the Semipelagians and the disciples of Augustin prevailed much, and continued to divide the western churches.

SEMIPE'DAL. *a.* (*semi* and *pedis*, Lat.) Containing half a foot.

SEMIPELLU'CID. *a.* (*semi* and *pellucidus*, Lat.) Half clear; imperfectly trasparent (*Woodward*).

SEMIPERSPI'CUOUS. *a.* (*semi* and *perspicuus*, Lat.) Half transparent; imperfectly clear (*Grew*).

SEMIQUA'DRATE. SEMIQUA'RTILE. *s.* (In astronomy.) An aspect of the planets when distant from each other forty-five degrees, or one sign and a half (*Bailey*).

SEMIQUA'VER. *s.* (In music.) A note containing half the quantity of the quaver.

SEMIQUI'NTILE. *s.* (In astronomy.) An aspect of the planets when at the distance of thirty-six degrees from one another.

SEMIRAMIS, a celebrated queen of Assyria. Semiramis, when grown up, married Menones, the governor of Nineveh, and accompanied him to the siege of Bactra, where, by her prudent directions, she hastened the king's operations and took the city. These eminent services, but chiefly her uncommon beauty, endeared her to king Ninus, who asked her of her husband, who, when Ninus added threats to entreaties, hanged himself. No sooner was Menones dead, than Semiramis married Ninus, by whom she had a son called Ninyas. Ninus was so fond of Semiramis, that, at her request, he resigned the crown to her, and commanded her to be proclaimed queen and sole empress of Assyria. Semiramis then put him to death, the better to establish herself on the throne, and when she had no enemies to fear at home, she began to repair Babylon, which became one of the most superb cities in the world. It is supposed that she lived about 1965 years before the Christian era, and that she died in the 62d year of her age, and the 25th of her reign. Many fabulous reports have been propagated about Semiramis, and some have declared that for some time she disguised herself and passed for her son Ninyas.

SEMISE'XTILE. *s.* (In astronomy.) An aspect of the planets when they are distant from each other one twelfth part of a circle, or thirty degrees (*Bailey*).

SEMISPHE'RICAL. *a.* (*semi* and *spherical.*) Belonging to half a sphere (*Bailey*).

SEMISPHERO'IDAL. *a.* (*semi* and *spheroidal.*) Formed like a half spheroid.

SEMI-SPINALIS COLLI. In anatomy. Semispinalis sive transverso-spinalis colli of Winslow, spinalis cervicis of Albinus, and spinalis of Douglas. A muscle situated on the posterior part of the neck, which turns the neck obliquely backwards, and a little to one side. It arises from the transverse processes of the uppermost six vertebræ of the back; by as many distinct tendons ascending obliquely under the complexus, and is inserted into the spinous processes of all the vertebræ of the neck, except the first and last.

SEMI-SPINALIS DORSI. In anatomy. Semispinalis externus seu transverso-spinalis dorsi of Winslow. A muscle situated on the back, which extends the spine obliquely backwards. It arises from the transverse processes of the seventh, eighth, ninth, and tenth vertebræ of the back, by as many distinct tendons, which soon grow fleshy, and then become tendinous again, and are inserted into the spinous processes of all the vertebræ of the back above the eighth, and into the lowermost of the neck by as many tendons.

SEMI-SPINALIS EXTERNUS. See SEMI-SPINALIS DORSI.

SEMISAGITTATESTIPULE, in botany, shaped like half the head of an arrow: as in ervum tetraspermum.

SEMISEXFID CALYX, in botany, half-six-cleft.

SEMI-TENDINO'SUS, in myology, a muscle, which is the semi-nervosus of Douglas and Winslow, is situated obliquely along the back part of the thigh. It arises tendinous and fleshy from the inferior, posterior, and outer part of the tuberosity of the ischium, in common with the long head of the biceps cruris, to the posterior edge of which it continues to adhere, by a great number of oblique fibres, for the space of two or three inches. Towards the lower part of the os femoris it terminates in a round tendon, which passes behind the inner condyle of the thigh bone, and becoming flat, is inserted into the upper and inner part of the ridge of the tibia, a little below its tuberosity. This tendon sends off an aponeurosis, which helps to form the tendinous fascia that covers the muscles of the leg. This muscle assists in bending the leg, and at the same time draws it a little inwards.

SEMITE'RTIAN. *s.* (*semi* and *tertian.*) An ague compounded of a tertian and a quotidian (*Arbuthnot*).

SEMITONE, in music, one of the degrees, or concinnous intervals, of concords.

There are three degrees, or less intervals, by which a sound can move upwards and downwards successively from one extreme of any concord to the other, and yet produce true melody; and by means whereof several voices and instruments are capable of the necessary variety in passing from concord to concord. These degrees are the greater and less tone, and the semitone. The ratio of the first is 8 : 9; that of the second 9 : 10.

The ratio of the semitone is 15 : 16; its compass is five commas; which interval is called a semitone, not that it is geometrically the half of either of the tones, for it is more; but because it comes somewhat near it. It is also called the natural semitone, and the greater semitone, because greater than the part it leaves

behind, or its complement to a tone, which is four commas. The Italians also call it *seconda minore*, or a lesser second.

There are several species of semitones; but those that usually occur in practice are of two kinds, distinguished by the addition of greater and less. The first is expressed by the ratio of 16 to 15, or $\frac{16}{15}$; and the second by 25 to 24, or $\frac{25}{24}$. The octave contains ten semitones major, and two dieses, nearly; for the measure of the octave being expressed by the logarithm 1,000000, the semitone major will be measured by 0,093109; and the octave contains seventeen semitones minor, nearly. If the measure of the octave be the logarithm 1,000000, the measure of the semitone minor will be 0,058894. These two differ by a whole enharmonic diesis; which is an interval practicable by the voice, and was much in use among the ancients, and not unknown even among the modern practitioners. Euler, Tent. Nov. Theor. Mus. p. 107. See INTERVAL.

These semitones are called fictitious notes; and, with respect to the natural ones, are expressed by characters called flats and sharps.

Their use is to remedy the defects of instruments, which, having their sounds fixed, cannot always be made to answer to the diatonic scale.

By means of these we have a new kind of scale, called the

SEMITONIC SCALE, or the SCALE OF SEMITONES; a scale or system of music, consisting of 12 degrees, or 13 notes, in the octave, being an improvement on the natural or diatonic scale, by inserting between each two notes thereof, another note, which divides the interval or tone into two unequal parts, called semitone.

The use of this scale is for instruments that have fixed sounds, as the organ, harpsichord, &c. which are exceedingly defective on the foot of the natural or diatonic scale. For the degrees of the scale being unequal, from every note to its octave there is a different order of degrees; so that from any note we cannot find any interval in a series of fixed sounds; which yet is necessary, that all the notes of a piece of music, carried through several keys, may be found in their just tune, or that the same song may be begun indifferently at any note, as may be necessary for accommodating some instrument to others, or to the human voice, when they are to accompany each other in unison.

The diatonic scale, beginning at the lowest note, being first settled on an instrument, and the notes thereof distinguished by their names, *a*, *b*, *c*, *d*, *e*, *f*, *g*; the inserted notes, or semitones, are called fictitious notes, and take the name or letter below with a ♯, as *c* ♯ called *c* sharp; signifying that it is a semitone higher than the sound of *c* in the natural series; or this mark ♭, called a flat, with the name of the note above, signifying it to be a semitone lower.

Now $\frac{15}{16}$ and $\frac{128}{135}$ being the two semitones the greater tone is divided into; and $\frac{15}{16}$ and $\frac{24}{25}$, the semitones the less tone is divided into; the whole octave will stand as in the following scheme, where the ratios of each term to the next are written fraction-wise between them below.

Scale of Semitones.

c.	*c* ♯.	*d.*	*d* ♯.	*e.*	*f.*	*f* ♯.	*g.*	*g* ♯	*a* ♭	*b.*	*c c*
$\frac{15}{16}$	$\frac{128}{135}$	$\frac{15}{16}$	$\frac{24}{25}$	$\frac{15}{16}$	$\frac{128}{135}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{24}{25}$	$\frac{15}{16}$	$\frac{128}{135}$	$\frac{15}{16}$

For the names of the intervals in this scale, it may be considered, that as the notes added to the natural scale are not designed to alter the species of melody, but leave it still diatonic, and only correct certain defects arising from something foreign to the office of the scale of music, viz. the fixing and limiting the sounds; we see the reason why the names of the natural scale are continued, only making a distinction of each into a greater and less. Thus an interval of one semitone is called a less second; of two semitones, a greater second; of three semitones, a less third; of four, a greater third, &c.

A second kind of semitonic scale we have from another division of the octave into semitones, which is performed by taking an harmonical mean between the extremes of the greater and less tone of the natural scale, which divides it into two semitones nearly equal.

But this is a subject which, however interesting it may be to many persons, is too speculative to be farther pursued in this place.

SEMIVO'WEL. *s.* (*semi* and *vowel.*) A consonant which makes an imperfect sound, or does not demand a total occlusion of the mouth (*Broome*).

SEMONES. (*quasi semi-homines*), inferior deities of Rome, that were not in the number of the 12 great gods. Among these were Faunus, the Satyrs, Priapus, Vertumnus, Janus, Pan, Silenus, &c.

SEMPACH, a town of Swisserland, in the canton of Lucern; celebrated for the battle, in 1386, which established the liberty of the Swiss, and in which Leopold duke of Austria was defeated and slain. It is seated on a small lake of the same name, seven miles N.W. of Lucern.

SEMPERVIRENT LEAVES, in botany, evergreen leaves. An improper expression: for though the plant be evergreen, the leaves are not so.

SEMPERVIVUM. Houseleek. In botany, a genus of the class dodecandria, order pentagynia. Calyx inferior, twelve-parted; petals twelve; capsules twelve, many-seeded. Fourteen species; natives of the warmer parts

of Europe, Madeira, or the Canaries; except sempervivum tectorum, which grows wild on old walls in our own country.

The following are cultivated.

1. S. tectorum. Common houseleek.
2. S. globiferum. Globular houseleek.
3. S. arachnoideum. Cobweb houseleek.
4. S. montanum. Mountain houseleek.
5. S. arboreum. Tree houseleek.
6. S. Canariense. Canary houseleek.

The herbaceous sorts are all capable of being increased by planting their offset-heads, which should be slipped with a few root-fibres appended, and planted in the spring on rubbish, rock-work, or other dry waste earth, or in pots for variety. The Canary species is propagated by seeds sown in the autumn or early spring; the tender green-house sorts may be raised from cuttings of the branches or from seeds; the first mode answers best.

SEMPERVIVUM ACRE. The stone crop is occasionally so termed. See ILLECEBRA.

SEMPITE'RNAL. *a.* (*sempiternus*, Lat.) 1. Eternal in futurity; having beginning, but no end (*Hale*). 2. In poetry it is used simply for eternal.

SEMPITE'RNITY. *s.* (*sempiternitas*, Lat.) Future duration without end (*Hale*).

SEMPLICE. (Ital.) In music, a word implying that the movement before which it is placed is to be performed with chasteness and simplicity.

SEMPRE. (Ital.) Always, or throughout: as, *sempre piano*, soft throughout.

SEMPRONIA, a Roman matron, mother of the two Gracchi, celebrated for her learning, and her private, as well as her public virtues.—Also a sister of the Gracchi, accused of having assisted the triumvirs Carbo, Gracchus, and Flaccus, to murder her husband, Scipio Africanus the younger. The name of Sempronia was common to the female descendants of the family of the Sempronii, Gracchi, and Scipios.

SEMPRONIUS. This name was common to many eminent Romans, the most celebrated of whom are—1. A. Atratinus, a senator who opposed the Agrarian law, which was proposed by the consul Cassius soon after the election of the tribunes.—2. Blæsus, a consul who obtained a triumph for some victories gained in Sicily.—3. A legionary tribune who led away from Cannæ the remaining part of the soldiers who had not been killed by the Carthaginians. He was afterwards consul, and fought in the field against Annibal with great success. He was killed in Spain.—4. Tiberius Gracchus, a consul who defeated the Carthaginians and the Campanians. He was afterwards betrayed by Fulvius, a Lucanian, into the hands of the Carthaginians, and was killed, after he had made a long and bloody resistance against the enemy. Annibal shewed great honour to his remains, a funeral pile was raised at the head of the camp, and the enemy's cavalry walked round it in solemn procession.

SE'MSTRESS. *s.* (ꝛeamerꝛe, Saxon.) A woman whose business is to sew; a woman who lives by her needle (*Swift*).

SENA, a town of Umbria, in Italy, on the Adriatic, built by the Senones, after they had made an irruption into Italy, A. U. C. 396; and on that account called Gallica. It was near it that Asdrubal was defeated by Cl. Nero. (*C. Nep.* &c.)

SENA. See SENNA and CASSIA.

SE'NARY. *a.* (*senarius*, Latin.) Belonging to the number six; containing six.

SENATE, in general, is an assembly or council of senators; that is, of the principal inhabitants of a state, who have a share in the government. The senate of ancient Rome is of all others the most celebrated. It exercised no contentious jurisdiction; but appointed judges, either from among the senators or knights, to determine processes: it also appointed governors of provinces, and disposed of the revenues of the commonwealth, &c. Yet did not the whole sovereign power reside in the senate, since it could not elect magistrates, make laws, or decide of war and peace; in all which cases the senate was obliged to consult the people.

The senate, when first instituted by Romulus, consisted of 100 members; to whom he afterwards added the same number when the Sabines had migrated to Rome. Tarquin the ancient made the senate consist of 300, and this number remained fixed for a long time; but afterwards it fluctuated greatly, and was increased first to 700, and afterwards to 900 by J. Cæsar, who filled the senate with men of every rank and order. Under Augustus the senators amounted to 1000, but this number was reduced, and fixed to 600. The place of a senator was always bestowed upon merit: the monarchs had the privilege of choosing the members; and after the expulsion of the Tarquins, it was one of the rights of the consuls, till the election of the censors, who from their office seemed most capable of making choice of men whose character was irreproachable, whose morals were pure, and relations honourable. Only particular families were admitted into the senate; and when the plebeians were permitted to share the honours of the state, it was then required that they should be born of free citizens. It was also required that the candidates should be knights before their admission into the senate. They were to be above the age of 25, and to have previously passed through the inferior offices of quæstor, tribune of the people, edile, pretor, and consul.

The senate always met of course on the 1st of January, for the inauguration of the new consuls; and in all months, universally, there were three days, viz. the calends, nones, and ides, on which it regularly met: but it always met on extraordinary occasions, when called together by consul, tribune, or dictator.

To render their decrees valid and authentic, a certain number of members was requisite, and such as were absent without some proper cause were always fined. In the reign of

Augustus, 400 senators were requisite to make a senate. Nothing was transacted before sunrise or after sun-set. In their office the senators were the guardians of religion, they disposed of the provinces as they pleased, they prorogued the assemblies of the people, they appointed thanksgivings, nominated their ambassadors, distributed the public money, and in short had the management of every thing political or civil in the republic, except the creating of magistrates, the enacting of laws, and the declarations of war or peace, which were confined to the assemblies of the people.

The senate was abolished by Justinian 13 centuries after its first institution by Romulus.

SENATE-HOUSE, a place of public council.

The name senate-house is given at Cambridge to the theatre where the public business of the university is conducted, degrees conferred, &c.

SENATOR, in general, denotes a member of some senate. The dignity of a Roman senator could not be supported without the possession of 80,000 sesterces, or about 700l. English money; and therefore such as squandered away their money, and whose fortune was reduced below this sum, were generally struck out of the list of senators. This regulation was not made in the first ages of the republic, when the Romans boasted of their poverty. The senators were not permitted to be of any trade or profession. They were distinguished from the rest of the people by their dress; they wore the laticlave, half-boots of a black colour, with a crescent or silver buckle in the form of a C; but this last honour was confined only to the descendants of those 100 senators who had been appointed by Romulus.

SENATO'RIAL. SENATO'RIAN. *a.* (*senatorius*, Latin.) Belonging to senators; befitting senators.

To SEND. *v. a.* pret. and part. pass. *sent.* (*rendan*, Saxon; *senden*, Dutch.) 1. To dispatch from one place to another (*Dryden. Swift*). 2. To commission by authority to go and act (*Milton*). 3. To grant as from a distant place (*Genesis*). 4. To inflict, as from a distance (*Deuteronomy*). 5. To emit; to produce (*Cheyne*). 6. To diffuse; to propagate (*Pope*). 7. To let fly; to cast or shoot.

To SEND. *v. n.* 1. To deliver or dispatch a message (*Clarendon*). 2. *To* SEND *for.* To require by message to come or cause to be brought (*Dryden*).

SE'NDER. *s.* (from *send.*) He that sends.

SENECA (L. Annæus), a native of Corduba, in Spain. He left Corduba, and went to Rome, where he became a Roman knight.—His son, L. Annæus Seneca, was early distinguished by his extraordinary talents. As one of the followers of the Pythagorean doctrines, Seneca observed the most reserved abstinence. In the character of a pleader, Seneca appeared with great advantage, but the fear of Caligula deterred him from pursuing his favourite study. He was made quæstor, but the aspersions thrown upon him on account of a shameful amour with Julia Livilla, removed him from Rome, and the emperor banished him for some time into Corsica. The disgrace of Messalina at Rome, and the marriage of Agrippina with Claudius proved favourable to Seneca, and after he had remained five years in Corsica, he was recalled by the empress to take care of the education of her son Nero, who was destined to succeed to the empire. In the honourable duty of preceptor Seneca gained applause, and as long as Nero followed his advice Rome enjoyed tranquillity. Seneca, well acquainted with the natural disposition of Nero, did not think himself secure; he had been accused of having amassed the most ample riches during the four years in which he had attended Nero as a preceptor, and therefore he desired him to accept of the riches, and to permit him to retire to solitude and study. Nero refused with artful duplicity, and Seneca, to avoid further suspicions, kept himself at home for some time, as if labouring under a disease. In the conspiracy of Piso, which happened some time after, Seneca's name was mentioned by Natalis, upon which Nero ordered him to destroy himself. Seneca was at table with his wife Paulina and two of his friends, when the messenger from Nero arrived. He heard the words which commanded him to destroy himself with philosophical firmness. His wife resolved to die with him, and their veins were opened at the same moment, but the life of Paulina was preserved. Seneca's veins bled but slowly, and to hasten his death he drank a dose of poison, but it had no effect; he then ordered himself to be carried into a hot-bath, to accelerate the operation of the draught; this was attended with no better success, and as the soldiers were clamorous, he was carried into a stove, and suffocated by the steam, on the 12th of April, in the 65th year of the Christian era, in his 53d year. His body was burnt without pomp or funeral ceremony. The compositions of Seneca are numerous, and chiefly on moral subjects. He is admired for his refined sentiments and virtuous precepts.

Some have imagined that Seneca was a Christian, but this notion is not supported by either his actions or his words. Tacitus informs us, that when he entered the bath he took up some of the water with which he sprinkled the slaves that were about him, "Addita voce, libare se liquorem illum *Jovi liberatori*," saying, "that he made that water a libation to Jupiter *the Saviour*." This does not indicate a very intimate acquaintance with Christianity, any more than the declaration in the 53d Epistle, that "In some respects the wise man *excels God.*"

SENECA, a lake and river of New York, in Onondago county. The lake is 30 miles long and two broad, and lies N. and S. between those of Canandaqua and Cayuga. At the N. end is the town of Geneva; and on the E side, between it and Cayuga lake, are the military

townships of Romulus, Ovid, Hector, and Ulysses. The river rises to the W. of Geneva, passes by that town, and receives the waters of the lake. It afterward receives the waters of Cayuga lake, Canandaqua creek, and Salt lake, and then flows into Onondago river.

SENECA, a town of New York, in Onondago county, situate on the N. side of the falls in Seneca river, 14 miles from its mouth, and 28 S. of Oswego.

SENECIO. Groundsel. Ragwort. In botany, a genus of the class syngenesia, order superflua. Receptacle naked, down simple; calyx invested with scales, many-leaved, equal; cylindrical; the leaves dead at the tip. A hundred and twenty-two species, scattered for the most part over the warmer climates of the globe, the greater number belonging to the Cape; eight common to the wastes, woods or marshes of our own country. The genus is thus subdivided.

A. Flowers without ray.
B. Flowers radiate, the ray revolute.
C. Flowers radiate, the ray spreading; leaves pinnatifid.
D. Flowers radiate, with the ray spreading; leaves undivided. This is by far the largest section.

The following species are cultivated.

1. S. hieracifolius. Hieracium-leaved groundsel.
2. S. pseudo-China. Chinese groundsel.
3. S. hastatus. Spleen-wort-leaved groundsel.
4. S. elegans. Elegant groundsel, or purple jacobœa.

The first is a native of North America; the second of the East Indies; the other two of the Cape. The purple jacobœa is an annual, with herbaceous branching stalks near three feet high; the flowers are produced in bunches upon the tops of the stalks, they are large, the ray a beautiful purple, the disk yellow. The flower opens in June or July, and is renewed by a fresh succession till the stalks are destroyed by the frosts.

SENEGA. See SENEKA.

SENEGA GUM. See GUMMI SENEGALENSE.

SENEGAL, a large river which rises in the mountains of Kong, in Negroland, and flows W. on the southern confines of Zahara, into the Atlantic ocean, 120 miles N.E. of Cape Verd. Its course is flexuous, till it arrives within six miles of the sea, when it takes a sudden turn to the S. and for 75 miles is separated from the sea only by a ridge of sand. Its mouth, not more than half a league over, is incommoded by a shifting bar, which renders the passage difficult and dangerous.

SENEGAL, a country on the W. coast of Africa, lying on a river of the same name. (See FOULI). The French have a fort and factory in an island at the mouth of the river, and are masters of the gum-trade. It is called Fort Louis, was taken by the English in 1758, confirmed to them by the peace of 1763, but restored in 1783. Lon. 16. 31 W. Lat. 15. 53 N.

SENEGAW MILKWORT. See SENEKA.

SENEKA. (so called because the Senecca or Senegaw Indians use it against the bite of the rattlesnake.) The rattlesnake-root-milkwort. Polygala senega of Linnéus. Polygala floribus imberbibus spicatis, caule erecto herbaceo simplicissimo, foliis, lato lanceolatis. C. O. Diadelphia. Octandria. The root of this plant was formerly much esteemed as a specific against the poison of the rattlesnake, and as an antiphlogistic in pleurisy, pneumonia, &c. but it is now entirely laid aside.

SENE'SCENCE. *s.* (*senesco*, Latin.) The state of growing old; decay by time (*Woodward*).

SENESCHAL. (*seneschallus.*) derived from the German *sein*, a house or a place, and *scale*, an officer: is a steward, and signifies one who has the dispensing of justice in some particular cases: as the high seneschal or steward of England; *seneschal de la hotel de roi*, steward of the king's household, seneschal, or steward of courts, &c. Co. Lit. 61. Croke's Jurisd. 102. Kitch. 83. See STEWARD.

SENGREEN. See SEDUM MAJUS, and SAXIFRAGA.

SE'NILE. *a.* (*senilis*, Latin.) Belonging to old age; consequent on old age (*Boyle*).

SE'NIOR. *s.* (*senior*, Latin.) 1. One older than another; one who, on account of longer time, has some superiority (*Whitgift*). 2. An aged person (*Dryden*).

SENIO'RITY. *s.* (from *senior.*) Eldership; priority of birth (*Broome*).

SENLIS, a town of France, in the department of Oise, lately a bishop's see. It is seated on the side of a hill, on the river Nonette, almost surrounded by a forest, 20 miles N.W. of Meaux, and 27 N.E. of Paris.

SENNA. (from *senna*, an Arabian word signifying acute, so called from its sharp-pointed leaves.) Senna alexandrina. Senna italica. Folium orientale. Senna, or Egyptian cassia. Cassia senna foliis sejugis subovatis, petiolis eglandulatis. C. O. Decandria. Monogynia. The leaves of senna which are imported here from Alexandria for medicinal use have a rather disagreeable smell, and a subacrid, bitterish, nauseous taste. They are in common use as a purgative. The formulæ given of the senna by the colleges are those of an infusion, a powder, a tincture, and an electuary. See CASSIA.

SENNA ALEXANDRINA. See SENNA.
SENNA ITALICA. See SENNA.
SENNA (Bladder). See COLUTEA.
SENNA (Scorpion). See CORONILLA.
SENNA (Wild). See CASSIA.

SENNAR, a city of Nubia, and the capital of a kingdom of the same. It is five miles in circumference, and very populous. The houses are chiefly of one story, with flat roofs; but the suburbs contain only cottages covered with reeds. The palace is surrounded by high

walls, and is a confused heap of buildings. The heats are almost insupportable in the daytime, except in the rainy season, which begins in April, and continues three months, at which time the air is unwholesome. The commodities are elephants teeth, tamarinds, civet, tobacco, and gold-dust. There is a market near the palace, where slaves are sold: the females sit on one side, and the males on another, and the Egyptians buy great numbers of them every year. The merchandise required here are spices, paper, brass, hardware, glass beads, and a black drug, which is used to colour the eyebrows. The women of quality have slight garments of silk, and wear rings of various metals on their hair, arms, legs, ears, and fingers. Women of a low rank, and girls, have clothes wrapped round them from the waist to the knees. The men go almost naked. Sennar is seated on an eminence, near the river Nile. Lon. 30. 0 E. Lat. 15. 4 N.

SE'NNIGHT. *s.* (contracted from *sevennight.*) The space of seven nights and days; a week (*Shakspeare*).

SENO'CULAR. *a.* (*seni* and *oculus*, Lat.) Having six eyes (*Derham*).

SENONES, an uncivilized nation of Gallia Transalpina, who left their native possessions, and under the conduct of Brennus invaded Italy, and pillaged Rome. They afterwards united with the Umori Latins and Etrurians, to make war against the Romans, till they were totally destroyed by Dolabella. The chief of their towns were Fanum Fortunæ, Sena, Pisaurum, and Ariminum.

SENRŒA, in botany, a genus of the class monadelphia, order decandria. Calyx double, the outer one three-leaved, inner five-toothed; petals five; style five-cleft; capsule probably five-celled. One species; a hoary downy plant of Arabia, with alternate, heart-shaped leaves; and axillary one-flowered peduncles.

SENS, a town of France, in the department of Yonne, and lately an archbishop's see. The cathedral is a handsome Gothic structure. It is seated in a fertile country, at the conflux of the Vanne with the Yonne, 25 miles N. of Auxerre, and 60 S.E. of Paris. Lon. 3. 17 E. Lat. 48. 12 N.

SENSATION, in philosophy, the perception of external objects by means of the senses.

Sensation or feeling is the consciousness of a change taking place in any part, from the contact of a foreign body with the extremities of our nerves. The seat of sensation is in the pulp of the nerves.

Sensations may be considered as of two kinds: 1. Those which arise from the impulse or impression of external bodies, which we therefore name *Sensations of impression.* 2. Those which arise from the mind's being conscious of its own action, and of the motions it excites; and these we name *Sensations of consciousness.*

Sensations of impression.—The sensations of impression are very various, but have been generally referred to five heads or kinds, commonly called the five senses; that is, those of sight, hearing, smell, taste, and touch. The four first of these are each of them, properly considered, as forming one genus of sensations: 1. As the particular sensations comprehended under each head, though very various, are, however, perceived to have somewhat common to all of them. 2. As those of the same genus all arise from impressions made upon one part of the body only, and that of a peculiar organization. 3. As those of the same genus all arise from the action of external bodies of one kind only, or of one and the same quality, by means of which they act upon our organs. No such characters concur in establishing one genus of the sensations referred to the fifth head of touch, which are various in all those respects; and physiologists seem to have referred to this head of touch every sensation that does not manifestly belong to the other four, and, among the rest, many of the sensations of consciousness. It might perhaps be useful to distinguish into genera the several sensations referred to touch; but it is not necessary to be done here. From certain sensations referred to touch it appears, that not only the extremities, but that every part of the nervous system is sentient with respect to certain impressions.

Sensations of consciousness.—The sensations of consciousness may be referred to the following heads: 1. Those of apperception, by which we are in general conscious of thinking, of perceiving, judging, and willing, and thereby of our existence and identity. 2. The sensations arising from the particular state of thinking, as perception, memory, and judgment, are more or less clear, ready, or exact. 3. The sensations arising from the particular state of volition, and its various modes. 4. The sensations arising from the general state of action, as vigorous or weak, easy or difficult. 5. The sensations arising from particular actions, or a consciousness of the actions excited, and of the motion of the different parts of the body. 6. The sensations arising from the diminution or absence of impressions.

Under each of these heads a great number of particular sensations are comprehended, but not necessary to be farther specified here.

Laws or general circumstances of sensation.—Of the four first genera, the sensations arising give no indication of the nature of the bodies acting on our organs, or of the mode of their action; and when we otherwise learn these circumstances, we can perceive no necessary connection between them and the sensations which they produce. But from certain sensations of touch and consciousness, we acquire the notions of solid figure, of motion, impulse, impenetrability, and the communication of motion, and consider the sensations as exactly correspondent to the circumstances of external bodies. At the same time, as we know of no other action of bodies on each other but that of impulse; and as, in the case of the sensations of the four first genera, we learn that an impulse takes place, we have comprehended the whole under the title of sensations of impression, and consider all of them as perceptions of impulse. To produce any sensation of impression, a certain force of impression is necessary; and from a lesser force, no sensation arises. The degree of force is likewise so limited on the other hand, that, in a high degree, it destroys the organ; and, in degrees approaching to this, a general sensation of pain, rather than the sensation of any particular object, is produced. Within these limits, however, our sensations are not exactly correspondent to the force of impression, nor do they make any exact estimate of that force. Usually sensation is relative to the change that is produced in the nervous

system; and a sensation proves strong or weak, only as it is stronger or weaker than that which had immediately preceded it, or than that degree of force to which the nerves had been immediately before accustomed. For this reason too the limits are very variable. Different sensations do not always imply a different kind of action in the bodies producing them; for sometimes different sensations arise merely from a different degree of force in the same kind of action, as is manifest in the case of heat and cold. To sensation from impression, a certain duration of impression is necessary. The mind's resting for some time upon one sensation, is called attention. This, like the duration, is necessary to give an impression its full effect. The mind seems to be determined to attention by the force of impression; by the pleasure or pain arising from it; by the degree of emotion or passion produced by these; and, lastly, by the emotions being more or less related to the person feeling. If the force and duration of impression, and the attention of mind, are all in the due degree, the sensation often remains for some time after the impression or action of the external body has ceased. The mind admits of, or can attend to, one sensation only at one time. Though the mind admits but of one sensation at one time, several impressions may act at the same time, if they be such as can unite in producing a single sensation; and such is the case of many of the impressions which produce the particular sensations of the same genus, as in those especially of colour, sound, smell, and taste. In each of these genera, many impressions, which separately produce particular species, can unite in producing a single sensation, which is always a neutral, or one different from either of the separate sensations.

This union of impressions may take place, either when the impressions are exactly synchronous, or when the one succeeds the other before the sensation of the first has ceased. Though the motion excited in the sentient extremities, by impression, remains some time, it must be supposed to become continually weaker, till at length it ceases altogether, and with it the sensation. The same impression, soon repeated, does not produce the same strength of sensation as before. Hence, all new impressions are, *cæteris paribus*, strongest; and moderate impressions, frequently repeated, produce no sensation, unless their force is considerably increased. Actions which at first produced a sensation of consciousness, as accompanied with volition, come, by repetition, to be performed without any sensation; or they produce it only when they are performed with uneasiness, pain, or unusual force. Impressions being given, their effects, in producing sensation, are different in different persons, and in the same person at different times. This must arise from some difference in the state of the bodies acted upon, which may perhaps be referred to the following heads: 1. The state of the common teguments, or other parts interposed between the impressing body and the medullary substance of the sentient extremity. 2. The different state of the medullary substance of the sentient extremities, as given to it in the original stamina. 3. The different state of tension in the medullary substance of the sentient extremities, as given to it by the state of the blood-vessels constantly connected with it. 4. The state of the medullary substance, as affected by heat or cold. 5. The state of it as produced by former impressions. 6. The state of the nerves along which the motion is propagated. 7. The state of the brain or sensorium. 8. The state of attention. Different parts of the body are sensible, and sensible only by means of nerves present in them; but anatomy does always determine certainly with regard to the presence or absence of nerves; and, therefore, the sensibility of several parts can be determined by experiment only; which, however, is also fallacious. Particular sensations arise from impressions of certain parts only: 1. Because the sentient extremities in these parts are so situated as to be exposed to the action of certain external bodies only. 2. Because the sentient extremities are connected with an organ that increases the force of the external agent, or modifies its action in the manner necessary to a determined impression. 3. Because the fibres of certain sentient extremities are, by their size or tension, fitted to be acted upon by certain external bodies only. 4. Because certain sentient extremities are so constantly preserved in a certain state, as to render them more sensible to a change. These circumstances determine the mode of impulse, but do not account for the sensation arising from it. Different sensations are accompanied with different judgments concerning the bodies making impression, and the part of the human body upon which it is made. Some sensations are referred to bodies at a distance; others, to external bodies in contact; and others to the feeling body itself.

When sensations are referred to our own bodies, it is in three sever always. They are most commonly referred to the part on which immediately the impression is made; and this, with regard to the external parts, very accurately; but, with regard to the internal, much less so: and, commonly, the sensations arising from internal parts, are referred to the incumbent external part, with some obscure distinction between superficial and more deep. 2. Sensations are sometimes referred, not to the part upon which the impression is immediately made, but to a distant more sensible part, to which a motion is propagated from the part impressed. 3. As sensations usually arise from impressions made upon the extremities of the nerves, and are referred to these; so impressions made on the nerves in their course, are sometimes referred to the extremities from whence they had commonly arisen. The sensations of consciousness are referred to the encephalon. So are those of impressions, if they are moderate; but, if more vehement, they are often referred to those parts in which their effects are exerted, as the heart and organs of respiration. The sensations of consciousness are seldom, with accuracy, referred to particular parts, but indistinctly to a whole member. We are not conscious of the action of particular muscles, except when their contraction is spasmodic. We are disposed to combine our sensations as united in one object; and thus form what is called complex ideas. We compare our several sensations, and from thence acquire new sensations of relation. When sensations formerly received are again renewed by the same objects, it is, for the most part, with a consciousness of their having been formerly received; and this faculty we call reminiscence. Perceptions formerly received can be renewed without the presence or action of the object which formerly gave occasion to them; and if this is attended with a consciousness of a difference between the vividity of the two perceptions, and particularly of the absence of the original objects, such a renewed per-

ception is called an idea; and the faculty by which this renewal is made, is called memory. Perceptions formerly received can, without the presence of the original object, be renewed also in such a manner, that the mind does not perceive any difference between the original and the renewed perception; and therefore, such renewal is always attended with the persuasion of the presence of the object. The faculty by which such renewal is made, we call imagination, more strictly. Reminiscence depends upon the force or frequent repetition of the former sensation. Memory depends upon an association of perceptions, which is formed by their being frequently repeated immediately after each other; by their being parts of the same complex idea; and, by their having relations marked. Memory is generally faithful to such associations; but it is more or less so in different persons, according to the number and importance of the relations marked; according to the frequency of the repetition of the sensations, and the marking of their relations; and according to the different states of the brain, very little known. Imagination seems always to depend upon internal causes, that is, upon causes acting in the brain. Memory and imagination renew distinctly the ideas of seeing and hearing only. All others are renewed imperfectly, or not at all, but all others may be associated with the sensations or ideas of seeing and hearing, so that these become signs of the others. The memory, in renewing these signs, so far renews the idea belonging to them, as to renew their several associations and relations; to renew, in some degree, the pleasure or pain which formerly attended the sensations themselves; and particularly to renew the emotions of mind, or motions of the body, which the sensations formerly produced. Most of our sensations, perhaps all of them, are either pleasant or painful. The words pleasant and painful are commonly generic terms, each of them comprehending a great many species, which seem to require being assorted under several different genera. Thus, in the first place, our sensations may be divided into those we desire, and those we are averse to. Of those we desire, we may distinguish those which arise from qualities we refer to other bodies, from those we refer entirely to our own. The first may be named more strictly the agreeable, the last the pleasant. In like manner, of the sensations we are averse to, we may distinguish the disagreeable and the painful. But, farther, the last must be distinguished from the sense of aversion, which accompanies certain sensations of consciousness, as the sense of debility, lassitude, difficulty, &c. and particularly from that which is referred obscurely to internal parts, and this we name anxiety. These sensations may be called the uneasy; and every one distinguishes this kind from that of the painful, more strictly so called. These last seem to be always sensations of impression, referred pretty accurately to a particular part. There is thus a foundation for establishing different genera of the sensations we desire, and of those we are averse to; as also, for greater precision in the employment of terms; but the fixing the limits of these genera, and assorting the several species, may be still difficult: so that we cannot be certain of applying the terms every where with strict propriety. The enumeration of the agreeable or disagreeable, and even of the pleasant sensations, would not be of much use here; and the enumeration of the uneasy and painful, though much more interesting, belongs to the pathology. However, we think it proper to deliver here the few following propositions. Sensation and action, within certain limits, are always desired; and the want of sensation, or imperfect and indistinct sensations, are always uneasy. In action of every kind, the sensations of debility and difficulty are also uneasy. In sensations of impression, their being pleasant or painful often depends on the degree of force in the impression, allowance being made for the sensibility of the system. As impressions, by being repeated, produce weak sensations, impressions at first painful may, by repetition, be changed into pleasant, and the pleasant into insipid and uneasy. Hence arises, with regard to moderate impressions, the pleasure of novelty, the desire of variety, and the desire of increasing the force of pleasant impressions. There is a condition of impressions, rendering them objects of desire or aversion, that cannot with certainty be referred to their force. This condition we call the quality of impressions. Impressions are often rendered objects of desire or aversion, by combination, succession, and relation. No sensations arise originally in the mind, without a previous change in the state of the body. Certain impressions, and certain states of the body, like to those which produce the sensations of consciousness, may both of them act upon the nervous system, without producing any sensation.

Senses.—The senses are distinguished into external and internal. The external are five, viz. smelling, seeing, hearing, tasting, and touching. These are considered under their respective heads. It is common to all these, that the medulla of the tender and pulpy nerve, being affected by external objects, transmits some change to that part of the brain where the fibres of the nerve affected first arise from the arteries of the brain. We know nothing more, than that new thoughts are excited in the mind, as often as a change of this kind, originating in any organ of sense, is transmitted to the origin of the nerve affected. For this perception is not an actual representation of the object, by which the sentient nerve is affected. The idea of redness has nothing in common with rays little refrangible, and separated from the seven portions of the total ray; and much less is it consistent with optical principles, for an image painted by rays upon a soft white nerve, to be conveyed for a long way, in perfect darkness, through a completely opaque body, to the origin of the optic nerves. There is nothing in the pain of burning that can represent to the mind the violent motion of a swift and subtle matter by which the particles of the nerves are removed from mutual contact. There is nothing in the idea of a sharp sound from a cord of a certain length that can inform the mind that the said cord vibrates 5000 times in the space of a second. Neither does the taste teach us that the crystals of sea-salt are of a cubical figure. Lastly, motion imparted by a body perceived by the senses, is indeed propagated to the brain, but the mind neither perceives this motion, nor the tremors of sound, nor the percussion of the rays of light, but something perfectly distinct from motion. It is established as a reciprocal law by the Creator, that with certain changes, produced first in the nerve, and then in the sensorium commune, new and definite thoughts shall arise in the mind, invariably connected; and that our perceptions of external objects are arbitrary, yet that they are

not false, appears plainly from the perpetual agreement of similar ideas with similar affections of the sentient nerves, in all persons at the same time, and in one person at different times.

Therefore, when we feel, five very different existences are conjoined: the thing which we perceive; the affection of the organ of sense by that body; the affection of the brain, arising from the percussion of that sensory; the change produced in the mind; and, lastly, the consciousness of the mind, and perception of the sensation.

It appears from certain experiments, that the first origin of every sentient nerve is always distinct from all the others; and that the change which is first excited by external objects in that nerve, continues long in its origin; and that those changes are generally so arranged in the said part of the brain, that, being disposed according to the order of time, those are nearest together which were either cotemporary, or occurred in immediate succession; or, lastly, those which have a relation to the same subject, or were excited by similar objects; insomuch that it is certain that new ideas are conveyed to the same part of the brain where others of the like kind are reserved: for otherwise, neither would the arbitrary signs of words and letters recal to the memory past ideas; or disagreeable ideas, returning into the mind, without the assistance of external objects, reproduce the same effects as objects themselves; nor, otherwise, could there be so constant and manifest a connection of analogous ideas, which supervene most remarkably in dreaming, to the corporeal impressions, acting at that time most powerfully. Imagination and memory depend on this conservation of ideas. Those changes conserved in the sensorium, which many term ideas, are, for the sake of distinction, by us called the impressions of things, as they do not exist in the mind, but are impressed in the body itself, and indeed in the medulla of the brain, in an incomprehensible manner, by certain characters, incredible in their minuteness, and infinite in their number. Amongst these the impressions received by the sight are the most remarkable, and most distinctly preserved, and next, those of hearing; those of the other organs are more confused, and less revocable by the will. Both the impressions and their signs are preserved; the latter more easily; the former, however, so far, that a painter can express with his pencil upon canvas, a face similar to the image of a familiar face, impressed upon his mind.

We are said to imagine, when by means of any image preserved in the sensorial part of the brain, the same ideas are excited in the mind which would arise if the sentient nerve that first produced the said image itself suffered that change. This we term recalling an image. This definition is confirmed by the example of the great strength of fancy in certain persons, and in those who are delirious, and in every person, in the instance of dreams, in which thoughts arise in the mind, occasioned by the images preserved in the brain, not at all weaker than those which are primarily produced by the change in the sentient nerve, from the external objects, and in which the perfect resemblances of persons and things with which we are occupied, are represented to the mind. Attention, quiet, and the absence of other objects, even obtain a stronger assent of the mind to these traces impressed on the brain, than to those perceptions which are excited in the mind by external objects; for the will is much more powerfully determined in those who dream, than in those who are awake; and some voluntary muscles perform, during sleep, functions, which while awake they never could perform, even when their nerves were most strongly affected by the same object. From hence we may understand how it is possible, that a very vivid internal impression in delirium may so impose upon the mind, as to be mistaken for the perception of an external object; which is evident in the sparks which are excited by rubbing the optic nerve; in the redness seen by the eye when shut; in the vertigo that arises from a motion of the retina, which we ascribe to the external objects themselves; in double vision, &c.

Memory is said to be exercised, when any thought of the mind, or image of an external object preserved in the sentient part of the brain, excites any perception in the mind. This is commonly weaker than in imagination, and almost confined to certain arbitrary signs, which the mind conjoined with that idea at its first preception. For memory hardly represents the images and pictures of things to the mind, but almost only words, and certain attributes, and abstract ideas; for which reason it excites volition less powerfully. But it appears from the observation of the phœnomena of memory, that those changes which arise from the external senses, remain long in the brain; and sometimes, if they made a strong impression, are represented to the mind for a long period, almost for ever; but that they are gradually weakened and impaired; unless they be renewed, either by the object being represented again to the mind, or by the mind itself recalling the same change again into memory; and that at last the change will be in a manner erased, and entirely lost, and the idea which was connected with that change by the law of nature will never again recur to the mind. This annihilation is gradually effected by new and different impressions made on the sensorium, and not from time only, or the circulation of the blood, as in cataleptic patients, who sometimes after a considerable interval of time, return to the same train of thought which the disease had interrupted. But sometimes all of them will be suddenly destroyed by some disease, in which the brain is in some way compressed, either by the blood or any other cause. Such a cause, acting on part of the common sensory, blots out a part of the impressions from the memory, such as certain words, or all of them, the characters by which we express words, or our friends, and even the necessaries of life; yet all these impressions may often be renewed by removing the compressing cause. But the strength and duration of an idea depend upon its being unusual, excessive, or greatly conducing either to increase or lessen our felicity; and lastly, upon our attention to it, and repetition; which last renders the impressions so vivid, that their perception is at length mistaken by the mind for the perception of external objects, as in the case of maniacs.

Moreover, if we review the history of human life, it appears that in early infancy we have hardly any memory; only simple perceptions, that soon vanish: which, nevertheless, excite strong ideas in the mind, as we see from the crying of infants. The memory is perfected by degrees, and the ideas received from favourite objects, and familiar persons, remain impressed in the mind of the infant; while at the same time, the imagination likewise increases, which is often

very powerful in young children; as for example, in terror, which in no age produces more violent or deplorable effects. Afterwards, as the number of our ideas increases, the facility of preserving past ideas is impaired, and, at the same time, the power of the imagination becomes torpid; till at last the former almost perishes, and the ideas which are received escape from the brain in a short time; while at the same time, the imagination, which is a kind of memory, languishes.

But since these perceptions produce various changes in the mind itself, which are perfectly distinct from any corporeal faculty, we shall briefly add something concerning them, so far as may suffice for the purposes of medicine. Thought resides in the soul, it attends to the sensations which are either brought by the senses, or recalled by the imagination; frequently also to the mere signs which recur into the mind. Attention is when one idea occupies the mind principally or solely for any length of time. The comparison of two ideas, instituted by the mind, is called judgment or genius, when the mind, by comparing them, discovers them to be alike or dissimilar. Genius consists in a vivid sensation conjoined with rapidity of thought, so as instantly to abstract from notions their points of similitude and dissimilitude. The principal source of judgment, invention, and wisdom, consists in the slow examination of ideas, by which they are considered by the mind in every point of view, and in the attention of the mind being confined to one object, to the exclusion of all other ideas. Hence the efficacy of darkness in making difficult calculations; the exquisite attention of blind people to the nature of sounds, and of those who are deaf, to colours. The sources of error are negligence in contemplating the whole idea, the estimating it from a partial view, and the connection of ideas with others that are distinct, and only related by accident, or external causes.

The integrity of the judgment depends upon a healthy constitution of the brain. For when that is compressed, irritated, exhausted of blood, or changed in its fabric, the use of reason is totally disturbed; the strong internal impressions on the brain are represented to the mind as external or real objects; the chain of ideas is broken, so that the mind does not compare them, or perceive their resemblance or diversity, but passes abruptly from one idea to another totally different; or lastly, the actions of the senses being impaired or interrupted, and all impressions being in a manner erased from the brain, man is reduced to a state of imbecility or vegetation. But external causes also have considerable influence in changing the relation of the mind to the impressions of the senses; the air, way of life, food, and habit, either assist or diminish the soundness of the judgment, the force of the imagination, and the strength of the memory.

Finally, as these ideas are either indifferent, or have some relation to our happiness, they produce different determinations in the will. Some of the causes by which the felicity of our mind is either increased or diminished, proceed entirely from the body, and are purely mechanical; amongst these are pain, disagreeable sensations, which seem to be produced by every sensation in a nerve that is too strong, and pleasure, in which the nerve is irritated beyond what is usual, but in a moderate degree. Itching is akin to pleasure, and in both the flow of blood is increased into the part in which either pleasure or titillation is perceived; but, when farther increased, it degenerates into pain, or excessive sensation in the nerve. Anxiety is from the blood being retarded in its passage through the lungs. Other ideas which affect the mind are either entirely unconnected with the properties of matter, or certainly less simple, understood, or mechanical, than the foregoing. The presence of good constitutes joy; the desire of good, love; the expectation of good, hope; the presence of evil, sorrow, terror, or despair; the dislike of evil, hatred; and the expectation of evil, fear. Hope, curiosity, and glory, seem to be affections of the human mind, which neither belong to the body, nor exist in beasts.

From these affections of the mind, not only the pure will appears to direct the actions of the body to a foreseen purpose, in order to attain good, and avoid evil, but also in the body itself, neither willing them nor capable of opposing them, various changes happen in the pulse, respiration, appetite, strength, and other functions of the heart, nerves, stomach, and other parts, which both immediately follow and indicate the passions of the mind. Thus anger violently excites the motion of the spirits, increases the motion of the heart, the frequency of the pulse, and the strength of the muscles; forces the blood into the ultimate and pellucid vessels, and even out of the vessels; accelerates the excretion of bile, terminates chronic diseases, and removes obstructions. Grief weakens the strength of the nerves, and action of the heart; retards the pulse; destroys the appetite; and produces paleness, cachexy, diarrhœa, jaundice, scirrhosities, and diseases arising from a stagnation of the humours. Fear diminishes the force of the heart, so as to occasion polypuses and paleness, weakens the muscular motions, relaxes the sphincters, increases inhalation, and diminishes exhalation. Excessive terror increases the strength even to convulsion; excites the pulse; removes obstructions, palsies; interrupts the course of the blood, and produces sudden death. Love, hope, and joy, promote perspiration, quicken the pulse, promote the circulation, increase the appetite, and facilitate the cure of diseases. Excessive and sudden joy often kills, by increasing the motion of the blood, and exciting a true apoplexy. Shame in a peculiar manner retains the blood in the face, as if the veins were tied; and also suppresses the menses, and has been even known to kill.

In what manner are these changes produced by the respective passions of the mind? Do nervous sphincters regulate the vessels, and at one time compress them subsultorily, and increase the motion of the blood, and at another relax them and destroy their tone? That something like this obtains in the smaller vessels appears evidently from the very similar effects produced by fear and cold upon the nerves of the skin. In the genital parts we manifestly see the veins, under particular circumstances, constricted, and a consequent accumulation of blood; and it seemed probable, that in the larger vessels, the nervous nooses surrounding many of them produced the same effects; for, in various parts, they surround and include the meningeal, temporal, vertebral, carotid, subclavian, cœliac, mesenteric, renal, and other arteries. But after it was shewn by our experiments that the nerves are at rest during the action of the muscles, and cannot be rendered shorter by any irritation, we were obliged to desert this elegant theory. Nor would it seem far from the

truth, that the arteries are rendered more or less irritable from the various sensibility of the nerves, and thus may be contracted more vehemently or languidly by the same quantity of blood, and that thus the motion of the blood is either quickened or retarded, if it were at all certain that the smaller arteries have the same irritable nature with the large ones. Thus the appetite and peristaltic motion of the stomach and intestines, are manifestly destroyed by the affections of the mind.

It cannot be denied that the Creator has affixed characteristic marks to the passions of the mind, that in social life man might not easily impose on man. For the respective muscles, more especially of the voice, face, and eyes, express the several passions of the mind so faithfully, that they may be even represented in painting. To investigate each of them would indeed be an elegant task, but too long for an article in this work. From the action of these muscles being often repeated physiognomy arises, so that the constant expression of the face retains something of the action of the prevailing muscles; and some character of frequent anger often remains in the countenance after the passion itself is gone off.

Whence proceeds the sympathy of parts, so famous in the practice of physic? In some of them it appears to depend upon the connection of the blood-vessels; by which the blood, being repelled from one part, presses more heavily upon another, which has its vessels from the same common trunk. This comprehends revulsions made by blood-letting; head-ach, from cold feet, &c. In other parts, the sympathy arises from a similitude in their fabric, by which they suffer like effects from the same causes arising in the body, such as the sympathy betwixt the womb and the breasts. Another cause is, the continuity of membranes, from hence the itching in the glans of the penis from calculus, the cure of deafness by diarrhœa. Another cause exists in the nerves themselves, and their anastomoses, as satisfactorily appears from the teeth being set on edge by certain sounds, a disagreeable sensation being produced in the maxillary nerve, on account of its various communications with the portio dura. Thus the sympathy of the eyes, which is not observable in like manner in the ears, proceeds from the decussation of the optic nerves; and vomiting is excited by nephritis. Lastly, another cause is referred to the common sensory, and beginnings of the nerves, which is demonstrated from general convulsions being produced by the irritation of a single nerve, and universal epilepsy by a local disorder, &c. Some sympathies in diseases arise from a translation of the matter to other parts through the cellular substance, or by the action of the muscles, arteries, or gravity. See SYMPATHY.

But that important sympathy remains to be explained, which subsists betwixt the body and the mind. For that the nature of the mind is different from that of the body is proved by an infinity of circumstances, especially by ideas and affections of the mind, to which nothing in sensation is analogous. For what is the colour of pride? or what the magnitude of envy or curiosity? to which there is nothing similar in animals; neither can that good which is desired by it, glory and the acquisition as it were of new ideas, be referred to any corporeal pleasure. Is it possible that the body can possess two kinds of forces, so that its infinite particles should unite into one mass, which do not preserve their own affections only, and represent them to themselves, but also join together into one common thinking whole, differing from the attributes of all, and yet capable both of receiving and comparing these attributes? Is there any instance of a body, which, without an external cause, passes from rest to motion, changes or reverses the direction of motion, without the action of some other cause, as is very easily observed with regard to the mind?

Yet this mind, so different from the body, is connected with it by the most intimate ties, being both obliged to think upon those impressions which the body presents to it, and not seeming to possess memory or judgment, independent of the corporeal impressions on the brain; and, lastly, by means of volition being the cause or occasion of the greatest and swiftest motions in the body.

Those have acted circumspectly who, confessing themselves ignorant of the manner in which the body and mind are united, have contented themselves with the laws established by the Creator, which they have ascertained and not conjectured. They are manifestly excused by the observation, that even in optics it is very certain that the affections of the body are connected with the thoughts of the mind, by an arbitrary relation, and that other ideas would have been suggested if the Creator had altered the figure, the refracting powers, or colours of the parts of the eye. As there is a law which establishes a perpetual connection between the least refrangible rays and the idea of a red colour; there is also a law which constitutes the connection betwixt the impression of those rays upon the retina, and the corresponding idea. Nor need we be more ashamed of our ignorance of the mechanism of the latter law, than of our ignorance of the nature of the former.

Does the mind govern the body? Do all the motions and actions in the body arise from the mind, as the immediate source and origin of motion? Do the motions of the heart, arteries, and respiration, arise from the mind, willing them and solicitous for the common good of the whole system? Is this power of the mind demonstrated by the structure of polypi formed in wounds, by the passions of the mind, and by the nævi materni? Is the absence of consciousness accounted for by the well-known example of the obscure perceptions we have in respiration, winking, and muscular motion, all of which are effected by the will, although we do not know the organs, or attend, that we will, when we breathe, wink, or walk, when occupied in thought? Is it therefore certain, that all motions arise from the mind, because there is no other evident cause perpetually connected with the body to which they can be referred?

There are many reasons which do not yet permit us to adopt this opinion. And, first, the construction and government of the body itself appear greatly to exceed the wisdom of the mind. Our mind sees one point distinctly, and thinks one thought distinctly; but if it endeavour to see two objects at the same time, to contemplate two ideas at the same time, or to read two letters at once, it always becomes confused, commits mistakes, and comprehends neither rightly; and conscious of its own powers, whenever it applies seriously and diligently to any object, it withdraws itself as it were from the impressions of sense, and neither sees, nor hears, nor smells, nor performs muscular actions. But the mind ought to be capable of infinite and distinct thoughts, in order to be able to govern such an infinite variety of muscles, vessels,

and fibres, in a manner accommodated to the most exact geometry; and to resolve and construct occasional problems in the direction of the muscles, scarcely soluble by the highest geometry; and yet we must conclude the mind ignorant of this immense task, and at the same time, over and above all those works, capable of contemplating the most difficult and abstract ideas; so that neither the care of the body disturbs its meditations, nor its meditations interfere with the necessary motions of the body.

Moreover, if, without being conscious of volition, we can will to respire, or wink, and with effect; we nevertheless retain our control, and can suspend respiration, and keep the eyelids firm, and alternately excite their actions, and therefore we never lose either the consciousness of our control, or the use of it. But we are not able to perform any thing of this kind in the heart or intestines; we cannot restrain their motion when too quick, or excite them when languid. Amongst all mankind, why does every one govern his respiration? why in all ages no one his heart? If custom only is the cause of our inconsciousness of this power, why is not the mind sensible of its action in moving the heart, or in exercising the peristaltic motion, after being suspended for hours, or even whole days, in swoons, in hysteric fits, and in asphexia?

But it is evidently false that all motions arise from the mind, and that without it matter would be an immoveable inert mass: for the contractility excitable by every stimulus, to which the motion of the heart, intestines, and perhaps all the other motions in the human body, belong, does not require the presence of the mind; it continues in the dead body; it is excited by mechanical causes, heat, and inflation; and it does not desert the fibres until they become stiff and cold, although the mind, which perceives and wills, may have been a long time expelled by the destruction of the brain and heart, and even although the muscle, by being taken out of the body, has been separated from every imaginable connection with the mind.

Little, if any, reliance is to be put in the nævi materni, as is noticed in another place. That the direction of the vital motions, in diseases, is not regulated by prudence, but almost entirely by the power of stimulus, we are explicitly taught by the most ancient and only certain practice, which restrains the excessive motions in acute and intermitting febrile diseases, by the use of bloodletting, opium, nitre, Peruvian bark, &c. The sage has no prerogative in the government of his body over the merest idiot: and that the fetus, which even at birth is ignorant of the motions of its muscles, and learns by experience to walk, to swallow and to see, constructs its body, fabricated with such incredible art, is an affirmation so repugnant to probability, and so absurd, that of itself alone it is sufficient to refute the hypothesis.

The state of aptitude for exercising the senses and voluntary motion, in healthy organs, is called wakefulness. Indisposition to such exercise, and their perfect rest, with healthy organs, is called sleep.

In sleep the mind either thinks not at all of what she knows or retains in memory; or only attends to the traces of past objects reposited in the common sensory, the vivid representations of which excite altogether the same perceptions in the mind as are made by the impression of external objects upon the organs of sense. These representations are called dreams; and have the effect, that while the rest of the emporium of the senses and muscular motion is at rest, some part remains open, is pervaded by the spirits, and watches. Sometimes certain voluntary motions are conjoined with these perceptions of the mind, so that the organs of speech, many, or all of the limbs, are directed by these perceptions, as in somnambulists.

But, during sleep, the motion of the heart proceeds, and also the distribution and circulation of all the humours in the body, the peristaltic motion of the stomach and intestines, and the action of the sphincters. Lastly, the respiration itself continues to be performed in like manner. This conjunction of the quiescence of certain organs with the motion of others, renders a knowledge of the mechanical cause of sleep difficult.

Therefore, in order to investigate it, we shall consider all the causes, and all the phœnomena, both of sleep and vigilance, and trace them in all kinds of animals. For that condition which is produced alike by all those causes, will be the true cause of sleep. Sleep naturally follows vigilance and the labours of human life. For when awake, there is almost a continual motion of the voluntary muscles, and of the organs of the senses, and the affections of the mind continually impart new stimuli to the nerves, blood-vessels, and heart. Thus the blood, by continual motion and trituration, is altered from a bland nature to an alkaline putridity; while the more subtle spirits are dissipated faster than they are replaced, and gradually not only debility and lassitude of the body are induced: and, if the want of sleep be protracted too long, also feverish heat, acrimony of the humours, and loss of strength. On the return of night, torpor is perceived in all the long muscles; the mind becomes unfit for deep thought, and the desire of rest pervades both mind and body. At this time, the powers which hold the body erect, suffer particularly; the eyelids close involuntarily, the lower jaw falls down, the necessity of yawning increases, the head nods forwards, the circumstances of external objects affect us less; and lastly, the ideas and thoughts become disturbed, and a delirium ensues; from which the transition to sleep is not perfectly known; but which invariably precedes sleep. In this natural sleep, which is common to all animals, the cause seems to be a deficiency of the nervous spirits, which have been in some manner consumed by muscular motion, and the exercise of the senses, and of which probably a great quantity is exhaled.

The absence of every irritation of the head, and other parts of the body, the perfect rest of the mind and external senses, and darkness, have great influence in promoting sleep.

Again, a variety of causes which debilitate, induce and increase sleep; such as great losses of blood, venesection, cooling medicines, opiates, and coldness of the atmosphere, and also applications which drive the blood from the head, as warm-bathing of the feet, and a plentiful meal, which always produce sleep in all kinds of animals.

On the contrary, again, various hot medicines induce sleep, by accelerating the flow of blood to the brain; such as wine, spirits of all sorts, but more especially when resolved into vapour, opium, hyoscyamus, the indigestible particles of our aliments, acute and malignant fevers of various kinds; or by retarding the return of the venous blood, as fatness. All these causes seem to

concur in this, that the blood being collected in the head, compresses the brain, and intercepts the course of the spirits into the nerves.

But likewise mechanical causes produce sleep; for example, every compressure of the dura mater and brain, whether from extravasated blood, a depressed bone, or a collection of water in the ventricles.

Sleep, therefore, is said to arise either from a simple absence, deficiency and immobility of the spirits, or from compression of the nerves; and always from the motion of the spirits through the brain being impeded.

This theory is supposed to be confirmed by the causes of vigilance: for all those things prevent sleep which produce plenty of spirits; more especially warm aromatic drinks, which send minute stimulating particles to the head; by which the motion of the blood is moderately quickened through the brain, and, being at the same time more diluted, it secretes more spirits in a given time.

Sleep, again, is prevented by cares of the mind, attentive and interesting meditation, and pain of body and mind; all of which prevent the spirits in the sensorium commune from resting, and the nerves from collapsing. Therefore, the former causes increase the quantity of the spirits, these increase their motion. And, therefore, we return to our former conclusion, namely, that the nature of sleep consists in the collapse of the nerves proceeding from the sensorium commune.

Is the region of sleep, therefore, in the ventricles of the brain? It is inconsistent with the universality of sleep, which extends to animals which have no ventricles in their brain. Do the vital actions continue during sleep, because it is an affection peculiar to the brain, and independent of the cerebellum? and what is the cause of this diversity, which occasions the animal functions to rest during sleep, and the vital functions to continue? These are questions which have never been answered satisfactorily: but we shall pursue the enquiry in the article SLEEP, to which the reader is referred for a new view of the subject.

The effect of sleep is the abatement of all the motions in the human body. For now the action of the heart alone remains to propel all the humours, while all the motions of the muscles and sentient nerves, and those originating from the passions of the mind and volition, are removed; by which, while awake, the course of the blood and spirits was promoted, as well as by the heart. The heart gradually returns from its quick and almost feverish pulsation to its morning slowness; the breathing becomes less and slower, the peristaltic motion of the stomach and intestines, hunger, digestion, and the progression of the feces, are all diminished; the thinner juices move more slowly, while the more sluggish are collected together, and the effused fat is accumulated; the nourishing jelly adheres more plentifully to its fibres and cavities; the consumption of the spirits, the attrition of the blood, and the quantity of perspiration, are all diminished. Thus, while the nervous fluid continues to be secreted, and its consumption to be diminished, it is by degrees accumulated in the brain, so as to distend and fill the collapsed nerves, and from the accession of the slightest stimulus, both the internal and external senses are excited to action, and the system is awakened. Sleep, continued for too great a length of time, disposes to all the disorders that attend slowness of circulation, to fatness, drowsiness, and cachexies; and is highly detrimental to the memory.

Whence the yawning of those about to sleep? To promote the passage of the blood through the lungs, which is now slower. Whence the stretching of the limbs? To overbalance, by the influx of the spirits, the natural contraction of the muscles, by which all the limbs are put in a moderate degree of flexion, and so to restore strength to the extensor muscles. Whence the opinion, that, during sleep, the motion of the heart becomes stronger, and the perspiration more plentiful? From the heat of the bed-clothes, by which the perspirable matter being confined, softens and relaxes the skin. But any one that sleeps in his usual garments grows colder; and animals which sleep through the winter become excessively cold, as dormice and hedge-hogs. Why do all animals grow sleepy after taking food? Not from pressure upon the aorta, or congestion of blood in the brain; for even animals which have scarcely any brain, sleep after food. Do the indigestible particles of our aliments, by passing less easily through the brain, and compressing its medulla, render the sleep less refreshing? Is dreaming perpetual and inseparable from sleep? Is it so far natural, and a kind of substitute for sensation to the mind, that it may never be without thought? This does not seem probable. We rather ascribe dreams to some morbid state, or to some stimulating cause, interrupting the perfect rest of the sensorium. Hence that sleep refreshes most which is without dreams, or at least without the remembrance of them. Hence they are generally wanting in the first sleep, at which time the spirits are most exhausted, and return in the morning when these are in some measure repaired. Hence care, the strong impression of some idea upon the memory, indigestible food, excess, or any uneasy posture of the body, occasion dreams; for they are usually generated by some sensation, with which, according to the laws of the association of ideas, the whole collection of similar impressions connect themselves. See VIGILENCE, and SLEEP.

SENSE. *s.* (*sens*, French; *sensus*, Latin.) 1. Faculty or power by which external objects are perceived; the sight, touch, hearing, smell, taste (*Davies*). 2. Perception by the senses; sensation (*Dryden*). 3. Perception of intellect; apprehension of mind (*Milton*). 4. Sensibility; quickness or keenness of perception (*Shakspeare*). 5. Understanding; soundness of faculties; strength of natural reason (*Pope*). 6. Reason; reasonable meaning (*Dryden*). 7. Opinion; notion; judgment (*Roscommon*). 8. Consciousness; conviction (*Dryden*). 9. Moral perception (*L'Estrange*). 10. Meaning; import (*Tillotson*).

SENSE (Common), is a term that has been variously used both by ancient and modern writers. With some it has been synonymous with public sense; with others it has denoted prudence; in certain instances it has been confounded with some of the powers of taste; and, accordingly, those who commit egregious blunders with regard to decorum, saying and doing what is offensive to their company, and inconsistent with their own character, have been charged with a defect in common sense. Some men are distinguished by an uncommon acuteness in discovering the characters of others; and this talent has been sometimes called com-

mon sense; similar to which is that use of the term, which makes it to signify that experience and knowledge of life which is acquired by living in society. To this meaning Quintilian refers, speaking of the advantages of a public education: *Sensum ipsum qui communis dicitur, ubi discet, cum se a congressu, qui non hominibus solum, sed mutis quoque animalibus naturalis est, segregarit?* Lib. i. cap. 2.

But the term common sense hath in modern times been used to signify that power of the mind which perceives truth, or commands belief, not by progressive argumentation, but by an instantaneous, instructive, and irresistible impulse; derived neither from education nor from habit, but from nature; acting independently of our will, whenever its object is presented, according to an established law, and therefore called sense; and acting in a similar manner upon all, or at least upon a great majority, of mankind, and therefore called common sense.

SE'NSED. *part.* Perceived by the sense (*Glanville*).

SE'NSEFUL. *a.* (from *sense* and *full.*) Reasonable; judicious: not used (*Norris*).

SE'NSELESS. *a.* (from *sense.*) 1. Wanting sense; wanting life; void of all life or perception (*Locke*). 2. Unfeeling; wanting sympathy (*Rowe*). 3. Unreasonable; stupid; doltish; blockish (*Clarendon*). 4. Contrary to true judgment; contrary to reason (*South*). 5. Wanting sensibility; wanting quickness or keenness of perception (*Peacham*). 6. Wanting knowledge; unconscious (*South*).

SE'NSELESSLY. *ad.* In a senseless manner; stupidly; unreasonably (*Locke*).

SE'NSELESSNESS. *s.* Folly; unreasonableness; absurdity; stupidity (*Grew*).

SENSIBI'LITY. *s.* (*sensibilité*, French.) 1. Quickness of sensation. 2. Quickness of perception; delicacy (*Addison*).

SENSIBILITY. The capability which a nerve possesses of conveying the sensation produced by the contact of another body with it. All parts possessed of a power of producing a change so as to excite a sensation are called sensible; those which are not possessed of this property insensible. To the insensible parts by nature belong all our fluids, the blood, bile, saliva, &c. and much of the solids, the hair, epidermis, nails, &c.; but the sensible parts are the skin, eyes, tongue, ear, nose, muscles, stomach, intestines, &c.

SE'NSIBLE. *a.* (*sensible*, French.) 1. Having the power of perceiving by the senses (*Raleigh*). 2. Perceptible by the senses (*Hooker*). 3. Perceived by the mind (*Temple*). 4. Perceiving by either mind or senses; having perception by the mind or senses (*Dryden*). 5. Having moral perception; having the quality of being affected by moral good or ill (*Shaks.*). 6. Having quick intellectual feeling; being easily or strongly affected (*Dryden*). 7. Convinced; persuaded (*Addison*). 8. In low conversation it has sometimes the sense of reasonable; judicious; wise (*Addison*).

SENSIBLE NOTE, in music, the appellation given to the sharp seventh of any key, because it renders the ear sensible of that key, and serves to announce the modulation of the harmony into a new key.

SE'NSIBLENESS. *s.* (from *sensible.*) 1. Possibility to be perceived by the senses. 2. Actual perception by mind or body. 3. Quickness of perception; sensibility (*Sharp*). 4. Painful consciousness (*Hammond*).

SE'NSIBLY. *ad.* (from *sensible.*) 1. Perceptibly to the senses (*Arbuthnot*). 2. With perception of either mind or body. 3. Externally; by impression on the senses (*Hooker*). 4. With quick intellectual perception. 5. (In low language.) Judiciously; reasonably.

SENSILE PLANTS. Sensitivæ plantæ. Sensitive plants. Situm partium tactæ mutantes. Changing the situation of their parts when touched.

SE'NSITIVE. *a.* (*sensitif*, Fr.) Having sense or perception, but not reason (*Hammond*).

SENSITIVE PLANT. See MIMOSA.

SENSITIVE PLANT (Bastard). See OSCHYNOMENE.

SE'NSITIVELY. *ad.* (from *sensitive.*) In a sensitive manner (*Hammond*).

SENSO'RIUM. SE'NSORY. *s.* (Latin.) 1. The part where the senses transmit their perceptions to the mind; the seat of sense (*Bac.*). 2. Organ of sensation. See CEREBRUM.

SE'NSUAL. *a.* (*sensuel*, French.) 1. Consisting in sense; depending on sense; affecting the senses (*Pope*). 2. Pleasing to the senses; carnal; not spiritual (*Hooker*). 3. Devoted to sense; lewd; luxurious (*Milton*).

SE'NSUALIST. *s.* (from *sensual.*) A carnal person; one devoted to corporal pleasures (*South*).

SENSUA'LITY. *s.* (from *sensual.*) Devotedness to the senses; addiction to brutal and corporal pleasures (*Davies*).

To SE'NSUALIZE. *v. a.* (from *sensual.*) To sink to sensual pleasures; to degrade the mind into subjection to the senses (*Pope*).

SE'NSUALLY. *ad.* (from *sensual.*) In a sensual manner.

SE'NSUOUS. *a.* (from *sense.*) Tender; pathetic; full of passion: not in use (*Milton*).

SENT. The participle passive of *send.*

SE'NTENCE. *s.* (*sentence*, French.) 1. Determination or decision, as of a judge civil or criminal (*Atterbury*). 2. It is often spoken absolutely of condemnation pronounced by the judge; doom (*Milton*). 3. A maxim; an axiom, generally moral (*Broome*). 4. A short paragraph; a period in writing (*Daniel*).

To SE'NTENCE. *v. a.* (*sentencier*, French.) 1. To pass the last judgment on any one (*Sh.*). 2. To condemn; to doom to punishment (*Temple*).

SENTENTIO'SITY. *s.* (from *sententious.*) Comprehension in a sentence (*Brown*)

SENTE'NTIOUS. *a.* (*sentencieux*, Fr.) 1. Abounding with sentences, axioms, and maxims, short and energetic (*Crashaw*). 2. Comprising sentences (*Grew*).

SENTE'NTIOUSLY. *ad.* In short sentences; with striking brevity (*Bacon*).

SENTE'NTIOUSNESS. *s.* (from *sententious.*) Pithiness of sentence; brevity with strength (*Dryden*).

SE'NTERY. *s.* (commonly written *sentry.*) One who is to watch in a garrison, or in the outlines of an army (*Milton*).

SENTICOSÆ, in botany. (*sentis*, a brier or bramble.) The name of the thirty-fifth order in Linnéus's fragments, and natural orders.

SE'NTIENT. *a.* (*sentiens*, Latin.) Perceiving; having perception (*Hale*).

SE'NTIENT. *s.* (from the adj.) He that has perception (*Glanville*).

SE'NTIMENT. *s.* (*sentiment*, French.) 1. Thought; notion; opinion (*Locke*). 2. The sense considered distinctly from the language or things; a striking sentence in a composition (*Dennis*).

SENTIMENT, according to lord Kames, is a term appropriated to such thoughts as are prompted by passion. It differs from a perception: for a perception signifies the act by which we become conscious of external objects. It differs from consciousness of an internal action, such as thinking, suspending thought, inclining, resolving, willing, &c. And it differs from the conception of a relation among objects; a conception of that kind being termed opinion.

SENTINEL, or SENTRY, in military affairs, a private soldier placed in some post to watch the approach of the enemy, to prevent surprises, to stop such as would pass without orders or discovering who they are. They are placed before the arms of all guards, at the tents and doors of general officers, colonels of regiments, &c.

SE'NTRY. *s.* (corrupted from *sentinel.*) 1. A watch; a sentinel; one who watches in a garrison or army (*Dryden*). 2. Guard; watch; the duty of a sentinel (*Brown*).

SENZA. (Ital.) In music. Without: as *senza stromenti*; without instruments. *Senza organo*; without the organ.

SENZA RIGORE. (Ital.) Not in strict time. In some degree ad libitum.

SEPARABI'LITY. *s.* (from *separable.*) The quality of admitting disunion or discerption (*Norris*).

SE'PARABLE. *a.* (*separable*, Fr. *separabilis*, Latin.) 1. Susceptive of disunion; discerptible (*Arbuthnot*). 2. Possible to be disjoined from something (*Locke*).

SE'PARABLENESS. *s.* (from *separable.*) Capableness of being separable (*Boyle*).

To SE'PARATE. *v. a.* (*separo*, Latin; *separer*, French.) 1. To break; to divide into parts. 2. To disunite; to disjoin (*Milton*). 3. To sever from the rest (*Boyle*). 4. To set apart; to segregate (*Acts*). 5. To withdraw (*Genesis*).

To SE'PARATE. *v. n.* To part; to be disunited (*Locke*).

SE'PARATE. *a.* (from the verb.) 1. Divided from the rest; parted from another (*Burnet*). 2. Disjoined; withdrawn (*Milton*). 3. Secret; secluded (*Dryden*). 4. Disunited from the body; disengaged from corporal nature (*Loc.*).

SE'PARATELY. *ad.* Apart; singly; not in union; distinctly; particularly (*Dryden*).

SE'PARATENESS. *s.* (from *separate.*) The state of being separate.

SEPARA'TION. *s.* (*separatio*, Latin; *separation*, French.) 1. The act of separating; disjunction (*Abbot*). 2. The state of being separate; disunion (*Bacon*). 3. The chemical analysis, or operation of disuniting things mingled (*Bacon*). 4. Divorce; disjunction from a married state (*Shakspeare*).

SE'PARATIST. *s.* (*separatiste*, French; from *separate.*) One who divides from the church; a seceder (*South*).

SEPARA'TOR. *s.* (from *separate.*) One who divides; a divider.

SE'PARATORY. *a.* (from *separate.*) Used in separation (*Cheyne*).

SEPIA. Cuttle-fish. Ink-fish. Body fleshy, receiving the breast in a sheath, with a tubular aperture at its base: arms eight, beset with numerous warts or suckers, and in most species two pedunculated tentacles: head short; eyes large; mouth resembling a parrot's beak. Eight species. These animals inhabit various seas, and in hot climates some of them grow to a prodigious size. They are armed with a dreadful apparatus of holders furnished with suckers, by which they fasten upon and convey prey to the mouth: they have the power of squirting out a black, and some of them a blackish-brown, fluid resembling ink, and employed as an ingredient in the composition of Indian ink, the black or blackish-brown hue depending upon the colour of the fluid employed: the bone in the back is converted into that useful article of stationary called pounce. The anatomy of this animal is highly singular: it is furnished with a large pair of lungs, or respiratory organs, situated nearly as in quadrupeds, but constituted on a different principle, and are more allied to the gills of fishes. The most striking peculiarity, however, in this animal is that of having three distinct hearts, constituting together the form of a triangle, the lowest being the largest. The eyes are remarkably large, and covered as in eels and some other fishes by the common skin which is transparent in those parts; the pupil of the eye appears double, and the internal cavity of the eye is lined with a purplish-coloured mucus, which causes the eyes of the living animal to appear phosphoric or fiery in a high degree. The eggs are deposited upon sea-weeds, and exactly resemble a bunch of grapes; at the instant the female deposits them they are white, but the males soon pass over them to impregnate them, and they then become black; they are round, with a little point at the end, and in each of them is inclosed a living cuttle-fish surrounded by a gelatinous fluid.

We shall select a few examples.

1. S. octopus. Body without tail or appendage; with pedunculated tentacles, or longer arms. Body short, rounded behind;

arms tapering to a point, joined at the base by a membrane or web, and covered within with two rows of alternate suckers. Inhabits the Mediterranean and Indian seas; in the latter of which it sometimes grows to a vast size, the arms being nine fathoms long. In these seas the Indians never venture out without hatchets in their boats to cut off the arms, should it attempt to fasten upon them and draw them under water. When opened this animal is said to exhibit so strong and splendid a light, as perfectly to illuminate a dark room.

2. S. officinalis. Body without tail or appendage, and surrounded by a margin; tentacles or longer arms two, four times as long as the other eight arms, and furnished with numerous suckers. Inhabits the ocean, and is the prey of the whale-tribe and of plaise: its arms are also frequently eaten off by the conger eel, and are reproduced: the bony scale on the back is that which is usually sold in the shops, and the black matter which it squirts out to darken the waters round it, and elude the pursuit of its enemies, is often used as ink. This animal was formerly eaten by the ancients, and is now used as food by the Italians.

3. S. loligo. Calamary. Body subcylindrical, subulate, and furnished with a flattish sharp-edged rhomboic membrane at each side of the tail. Colour of the body reddish-brown, with two longer arms or tentacles; eyes fine blue; the cartilaginous plate or back-bone is long, lance-shaped, and transparent.

4. S. tunicata. Body entirely inclosed in a black pellucid membrane, with two semicircular wings or processes behind. The body is very large, sometimes weighing a hundred and fifty pounds; and convertible into a very pleasant and palatable food. Inhabits the Pacific Ocean. See Nat. Hist. Pl. CLXIV.

SEPIARIÆ, in botany. (*sepes*, a hedge.) The name of the twenty-fifth order in Linnéus's fragments; and of the forty-fourth in his natural orders: containing the hedge plants.

SEPIDIUM, in the entomology of Fabricius a tribe of the coleopterous genus Pimelia, which see.

SE'PILIBLE. *a.* (*sepio*, Latin.) That may be buried (*Bailey*).

SE'PIMENT. *s.* (*sepimentum*, Latin.) A hedge; a fence (*Bailey*).

SEPOSI'TION. *s.* (*sepono*, Latin.) The act of setting apart; segregation.

SEPS. See Basilicus.

SEPSIS. (from σηπω, to putrefy.) Putrefaction.

SEPT. *s.* (*septum*, Latin.) A clan; a race; a family; a generation (*Davies*).

SEPTA'NGULAR. *a.* (*septem* and *angulus*, Latin.) Having seven corners or sides.

SEPTAS, in botany, a genus of the class heptandria, order heptagynia. Calyx seven-parted; petals seven; germ seven; capsules seven, many-seeded. One species only, a Cape plant; with bulbous root, herbaceous stem; leaves rounded, crenate, clustered together below the middle of the stem; flowers in terminal umbels; the calyx and corol red on the outside.

SEPTE'MBER. *s.* (Latin.) The ninth month of the year; the seventh from March.

SE'PTENARY. *a.* (*septenarius*, Latin.) Consisting of seven (*Watts*).

Se'ptenary. *s.* The number seven (*Br.*).

SEPTE'NNIAL. *a.* (*septennis*, Latin.) 1. Lasting seven years. 2. Happening once in seven years (*Howel*).

Septennial elections. Blackstone, in his Commentaries, Vol. I. p. 189. says, (after observing that the utmost extent of time allowed the same parliament to sit by the stat. 6 W. and M. c. 2. was three years), "But, by the statute 1 Geo. I. st. 2. c. 38. (in order professedly to prevent the great and continued expenses of frequent elections, and the violent heats and animosities consequent thereupon, and for the peace and security of the government, just then recovering from the late rebellion), this term was prolonged to seven years; and what alone is an instance of the vast authority of parliament, the very same house that was chosen for three years enacted its own continuance for seven."

SEPTENTRIO, in astronomy, a constellation, more usually called ursa minor. In cosmography, the term septentrio denotes the same with north: and hence septentrional is applied to any thing belonging to the north; as septentrional signs, parallels, &c.

SEPTE'NTRION. *s.* (French; *septentrio*, Latin.) The north (*Shakspeare*).

Septe'ntrion. Septe'ntrional. *a.* (*septentrionalis*, Latin; *septentrionel*, Fr.) Northern (*Philips*).

SEPTENTRIONA'LITY. *s.* (from *septentrional.*) Northerliness.

SEPTE'NTRIONALLY. *ad.* (from *septentrional.*) Toward the north; northerly.

To SEPTE'NTRIONATE. *v. n.* (from *septentrio*, Latin.) To tend northerly (*Brown*).

SEPTIC. (from σηπω, to putrefy.) Promoting putrefaction; the opposite to antiseptic. Relating to putrefaction.

SE'PTICAL. *a.* (σηπτικος.) Having power to promote or produce putrefaction (*Brown*).

SEPTILA'TERAL. *a.* (*septem* and *lateris*, Latin.) Having seven sides (*Brown*).

SEPTON. (σηπω, to putrefy.) The matter of putrefaction, or producing putrefaction; and hence the matter of contagion and infection, as causes of putrefaction.

In the article Contagion we have endeavoured to establish a distinction between the meaning of the terms contagion and infection, which the very loose manner in which they are employed appears to render necessary. We shall, however, refer to that article without repeating it; and shall here limit our considerations to the general causes of contagion, or the sources from which septon, or the contagious fomes, originates, and the means by which it is most effectually resisted, and which, from the same term, are usually denominated antiseptics.

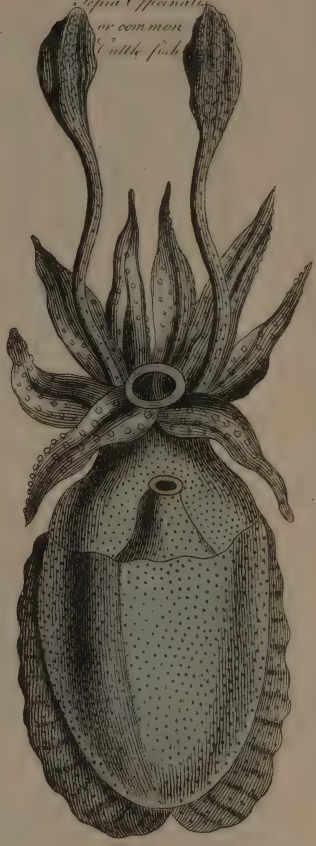
Phosphoric Pyrozoma



Eggs of Cuttle Fish commonly called Sea grapes.



Sepia Officinalis or common Cuttle fish



Lepas Anatifera or Barnacle Shell with other Species at the Base



Pinna Radis or Great Sea Pinna



London, Published by Sherwood & Co. Paternoster Row June 1st 1812.

It is well known, that during the spontaneous decomposition of vegetable, veget-animal, but more particularly of animal substances, a gaseous invisible matter is extricated; and this is capable of acting more or less powerfully on the living animal body, and of producing different degrees of disease, from the common intermittent or ague, to the most terrible of all disorders, the plague; and when this vapour is in its most concentrated state, and it is sometimes found on suddenly opening inhumid coffins in church-yards or other cemeteries, its poison is so deleterious as to produce immediate death. This poisonous effluvium is called miasm, or miasma, and when spoken of plurally, miasms, or miasmata. It is found to exist in low, marshy, and swampy grounds, and about the environs of burial-places, in which numerous bodies have been interred, and wherever large quantities of vegetable, or veget-animal, or animal matters, are exposed to the open air under a hot sun, so that they may attain their highest degree of putrefaction. It differs, however, in its virulence. Thus, in the northern climates, where the process of putrefaction is very slow, from its accessory causes being moderate, the diseases produced by septon or miasm are generally agues, and they seldom extend beyond dysentery: while in the eastern parts of the world, as in Bengal, on both sides of the Ganges, in Louisiana, overflowed by the Mississippi, and in Egypt, covered annually by the Nile, when the waters retire and leave behind them mud and slime, the great heat of the sun acting with unremitting force upon the relics which teem with myriads of animal beings, the miasm produced is so violent as to give rise to the most dreadful pestilence, and in its most deadly form.

In the West Indies, and some of the coast countries of the Levant, many of these causes are blended together, and exist with different degrees of virulence; and hence the diseases they excite are various in their nature and intensity; and it not unfrequently happens, that whatever be the disease produced, such a change is excited in the animal system that has been affected by it, that the miasm loses its influence for a considerable term of time afterwards, and, in many instances, a term that extends to the common range of human life: and hence those who have been recovered from several of these contagious or infectious maladies, are seldom or never affected by them afterwards.

We have here stated these diseases to be, in general terms, contagious or infectious: yet it has, in different periods of the world, and especially in our own day, been a question warmly agitated, whether any of them be really contagious, or, in other words, communicable directly or indirectly by persons affected. Among the ancients, Galen, Aristotle, Thucydides, Seneca, and among writers of later times, Forestus, Prosper Alpinus, Diemerbroeck, and Sydenham, contended that the plague, and all other pestilential diseases, are strictly contagious: whilst Procopius, and various others who have united with Procopius in opinion, produce, in the first instance, the silence of Hippocrates, Avicenna, and other Arabian physicians, on the subject of their being contagious, and furthermore affirm, that if the plague were a contagious malady, it would always infect those who communicate with the diseased.

Among modern authors, Dr. Smith of America, Dr. Maclean, and various others, have concurred in denying the contagious nature of pestilential diseases. Dr. Maclean has attempted to prove that the plague, dysentery, and other epidemics, are never propagated by contagion, since only a very small portion of those that have been exposed to the action of the effluvia of the deceased are ever affected by the distemper; he concludes those diseases only to be contagious which must necessarily act and communicate the disease within a certain distance, as the small-pox, or measles, and which can only be received once by the same person; whilst the others, which may affect a person several times during his life, are caused by certain states or vicissitudes of the atmosphere only. He affirms, that the existence of contagion in the plague, dysentery, and fevers, has been uniformly taken for granted, not only without proof, but even contrary to the evidence of numerous and convincing facts.

Although these and several other physicians of eminence, particularly Dr. Rush of Philadelphia, whose opportunities of observing the yellow fever, or plague of America, have been very great, are of opinion, that pestilential diseases arising from miasmata are not contagious; yet as such opinions may as yet be looked upon as conjectural, without any direct, explicit, and perfectly deciding facts, to place such opinions beyond the reach of all doubt and controversy, it would be highly improper in the present state of knowledge on this subject, for either the magistrate or the physician of a board of health to divest themselves of the least precaution, either by putting an end to quarantine, or by not applying to every other means that might place the safety and welfare of their fellow citizens beyond every the slightest suspicion and fear of terrible calamities.

Among the numerous opinions given respecting the causes of pestilential diseases, whilst some have even denied the existence of a putrid cause, others have been so convinced of its presence as to describe even its peculiar smell. Those who have had infectious air in their nostrils affirm it is easily distinguished from all other known odours; but the different accounts they give of it may afford some reason to suspect them of error. Some call it an earthy smell, very disagreeable, that in some measure affects the organ of taste, even extending into the stomach; others have compared it to the vapours issuing from a newly opened grave, but without the cadaverous stench; others think it resembles the effluvia of rotten straw; and others again are of opinion it is like the exhalations from the confluent small-pox at the turn of the pustules. The grave-diggers mentioned by Fourcroy spoke of the odour from the bursting of the lower belly, in a state of great putridity, to be a horrible stench; and whenever they are exposed by an unfortunate chance to bodies in the earth in this dangerous state, so great is its poisonous activity, that, if near, they are immediately struck with asphixy; if at some distance, it only gives them a slight vertigo, a disagreeable sensation of fainting, or of nausea, which continues several hours, followed by a loss of appetite, weakness, and tremours; hence arise those diseases which people are subject to who live in the neighbourhood of large cemeteries, a great number of whom have their countenances pale and wan, with other symptoms, announcing the action of a slow poison. From the circumstances, however, in which this poison is extricated, it is perhaps never admitted to the organ

of smell in its pure form, but generally accompanied by some other gasseous and disagreeable emanation, that may have given rise to the different opinions of its odour. With respect to the manner in which contagion is communicated, Dr. Carmichael Smith is of opinion, that it is not from a direct communication with the sick that contagious fevers are propagated, but that unfortunately the persons and clothes of those who remain long in a contagious atmosphere, and the excretions of the sick, are capable (even when conveyed to great distance, or preserved for a length of time) of producing the same mischief as an immediate communication with the sick themselves, and that the jail distemper and putrid contagion are thus frequently conveyed, cannot, he thinks, be denied. Indeed, wherever a vapour can be distinguished by the smell, we have the demonstration of our senses for what a length of time, not only clothes but furniture, and even boards and walls of houses will retain it; therefore, in respect to the jail or hospital fever, it may be safely affirmed, that it only attacks those immediately exposed to the original atmosphere, but that this contagion may be certainly communicated by the clothes of those that have been any length of time confined in it; and what is more surprising, even when the persons themselves are not affected. Indeed, the dread of these terrible diseases may have probably magnified the danger beyond reality, and the risk of propagating the contagion may not be so great as is supposed; physicians and apothecaries not being so long opposed to this atmosphere as to be in great danger of conveying the contagion elsewhere, yet the persons, and especially the clothes of nurses and assistants who are constantly confined amongst the sick, are certainly capable, according to Dr. Smith, of communicating the disease: but he adds that, however paradoxical it may appear, he never observed that the sick propagated the disease so readily as the bodies and clothes of those who, though well, had been long confined in the original atmosphere. He is of opinion that, unless where contagion is very powerful, it is seldom propagable in the open air, and he knew only of one instance of this at the prison at Winchester. He thinks there is but little risk of receiving contagion from the dissection of dead bodies, unless when the operator happens to cut himself.

The persons most susceptible of this contagion, Dr. Smith asserts, are those in an early period of life, particularly if they come directly from a pure air into an infected atmosphere: those whose minds are oppressed with fear or anxiety, or who have been weakened by previous illness: even those who have been fatigued or are fasting, receive it more readily than others whose strength has not been impaired, or which has been recruited by food. A moist atmosphere is also more favourable to the communication than a dry one, and a contagious person becomes greatly more so if his clothes be wet and his body heated by exercise, so as to be in a state of perspiration. It has likewise been remarked, that persons who have issues are seldom affected by contagion.

Putrid matter, in whatever way generated, if in sufficient quantity, has always some deleterious effect, acting as a poison upon the body; but this effect takes place whether the putrid matter be generated in the body, taken into the stomach, or by means of a wound into the blood. It is true, the human stomach, and still more remarkably the organs, of digestion of certain animals have a power of counteracting the septic tendency; but in the human stomach, at least, this power is limited; and whenever any matter, whether generated in the body, or introduced from without, has acquired a degree of putridity beyond this, it occasions nausea, vomiting, purging, great stomachic oppression, and often a fever of the intermittent, remittent, or continued kind. Putrid matter directly introduced into the system by means of a wound, causes swelling and inflammation of the lymphatic glands, often terminating suddenly in gangrene along with the symptoms of a fever, greatly resembling the hospital or jail fever; the same prostration of strength, tremors, anxiety, headach, and delirium, and the consentaneous symptoms of petechiæ, and hæmorrhage, indicating a decomposed state of the crasis of the blood. The fevers that arise from exposure to putrid vapour or contagion assume a variety of types and forms, according to the degree of putridity, season of the year, constitution of the patient, &c.; but they, as well as the preceding, will be found to have many symptoms in common, and similar, to the jail and hospital fever; and, in reality, all the fevers of this class, from the slightest vernal intermittent to the true plague, are only different shades or varieties of the same disease, and productions of one common cause, and that cause septon, or the active vapour of putrefaction.

What this active vapour is, or whatever else it may be, that arises during the putrefactive process, and discovers itself in the form of so powerful a poison, is unknown. A great variety of hypotheses have been offered upon the subject, but to this hour they are hypotheses, and nothing more, and it is hardly worth while to enter into an examination of them.

During the progress of contagion, and while exposed to its influence, cold chills, indigestion, and the depressing passions, should be avoided as much as possible. The sick rooms or wards should be well ventilated, and the discharges immediately removed. The attendants should often exchange the scene for free open air; the mouth and throat should be gargled with oxymel, decoction of bark, acidulated with sulphuric acid, or port wine. Decoction of bark taken three or four times a day with a few glasses of port wine, may also be useful, and an attention to the state of the bowels is of the utmost importance. But nothing will effectually preserve without a free exposure to the fresh, reviving atmosphere.

Other methods have of late years been united with these, and apparently with happy and extensive effect, we mean fumigations with vinegar, and the mineral acids in the form of air: the former of these has been long and generally in use, but the discovery of the power of the mineral acids is contested. The late Dr. Johnson, of Kidderminster, certainly first proposed this method; but from his publications there appears to be no evidence of his having employed the acid gasses. It seems, however, from his manuscripts, that he had done so; and indeed the ease with which it could be tried is a strong reason for believing that he actually used it. Dr. C. Smith, who received a parliamentary reward for this supposed discovery, seems to rest his claim, in a great measure, on his having substituted the nitrous gass in place of the muriatic, which had antecedently been employed, and was found in some degree offensive to the organs of respiration; but there is no doubt that,

previous to Dr. Smith's application to parliament, M. de Morveau had recommended similar trials.

The volatility of the acetous acid, or common vinegar, adapts it for the purpose of general diffusion without any preparation; and it is probably highly useful, though perhaps less efficacious, than the gasses of the mineral acids. It is also used in a highly concentrated state with aromatic oils: the first idea of which form was taken from a preservation said to have been employed by four thieves who plundered the victims of the plague with impunity, secured by the aromatic vinegar. It has since been prepared with great elegance and efficacy by Mr. Henry of Manchester, and sold under his name.

A more recent plan of this kind is the disinfecting bottle of M. de Morveau. The materials are preserved in a bottle made of strong glass, secured in a wooden case, the stopper being kept down by a screw. In this glass about eleven French drams of finely powdered black oxyd of manganese are put; and to these are added about three ounces by weight of pure nitric acid, of the specific gravity of 1.40, with an equal bulk of muriatic acid, of the specific gravity of 1.134. About two-thirds of the bottle must be empty: it is covered with a plate of glass, which is raised by a single turn of the screw. This plate must be ground and polished so as to close the bottle accurately, and every particle of dust must be carefully wiped off. When used it must not be held near the nose, as the pure oxygen gives pain when respired: but in a few minutes it will fill a large room with the gass. These materials, if the bottles be opened daily, will last six months. The price, when properly filled, is at Paris twenty-one franks for each. *Annales de Chimie*, vol. lii. p. 347. M. Dumotiez prepares bottles of a smaller size with less proportions of the same materials. The chief improvement is, that a small aperture is made by a turn of the screw. They are proportionably cheaper, and adapted for apartments of a common size.

SEPTUAGE'NARY. *a.* (*septuagenarius*, Lat.) Consisting of seventy (*Brown*).

SEPTUAGESIMA, in the calendar, denotes the third sunday before Lent, or before Quadrigesima Sunday: supposed by some to take its name from its being about seventy days before Easter.

SEPTUAGE'SIMAL. *a.* Consisting of seventy.

SEPTUAGINT, the name given to a Greek version of the books of the Old Testament, from its being supposed to be the work of seventy-two Jews, who are usually called the seventy interpreters, because seventy is a round number. The history of this version is expressly writen by Aristæas, an officer of the guards to Ptolemy Philadelphus, the substance of whose account is as follows: Ptolemy having erected a fine library at Alexandria, which he took care to fill with the most curious and valuable books from all parts of the world, was informed that the Jews had one containing the laws of Moses, and the history of that people; and being desirous of enriching his library with a Greek translation of it, applied to the high-priest of the Jews; and to engage him to comply with his request, set at liberty all the Jews whom his father Ptolemy Soter had reduced to slavery. After such a step, he easily obtained what he desired; Eleazar the Jewish high-priest sent back his ambassadors with an exact copy of the Mosaical law, written in letters of gold, and six elders of each tribe, in all seventy-two; who were received with marks of respect by the king, and then conducted into the isle of Pharos, where they were lodged in a house prepared for their reception, and supplied with every thing necessary. They set about the translation without loss of time, and finished it in seventy-two days: and the whole being read in the presence of the king, he admired the profound wisdom of the laws of Moses; and sent back the deputies laden with presents, for themselves, the high-priest, and the temple.

Aristobulus, who was tutor to Ptolemy Physcon, Philo who lived in our Saviour's time, and was contemporary with the apostles, and Josephus, speak of this translation as made by 72 interpreters, by the care of Demetrius Phalereus in the reign of Ptolemy Philadelphus. All the Christian writers, during the first 15 centuries of the Christian era, have admitted this account of the Septuagint as an undoubted fact. But since the reformation, critics have boldly called it in question, because it was attended with circumstances which they think inconsistent, or, at least, improbable. Du Pin has asked, why were 72 interpreters employed, since 12 would have been sufficient? Such an objection is trifling. We may as well ask, why did king James I. employ 54 translators in rendering the Bible into English, since Du Pin thinks 12 would have been sufficient?

1. Prideaux objects that the Septuagint is not written in the Jewish, but in the Alexandrian dialect; and could not therefore be the work of natives of Palestine. But these dialects were probably at that time the same, for both Jews and Alexandrians had received the Greek language from the Macedonians about 50 years before.

2. Prideaux further contends that all the books of the Old Testament could not be translated at the same time; for they exhibit great difference of style. To this it is sufficient, to reply that they were the work of 72 men, each of whom had separate portions assigned them.

3. The Dean also urges that Aristæas, Aristobulus, Philo, and Josephus, all directly tell us that the law was translated without mentioning any of the other sacred books. But nothing was more common among writers of the Jewish nation than to give this name to the Scriptures as a whole In the New Testament law is used as synonymous with what we call the Old Testament. Besides, it is expressly said by Aristobulus, in a fragment quoted by Eusebius (Præp. Evan. l. 1.), that the whole Sacred Scripture was rightly translated through the means of Demetrius Phale-

reus, and by the command of Philadelphus. Josephus indeed, says the learned Dean, asserts, in the preface to his Antiquities, that the Jewish interpreters did not translate for Ptolemy the whole Scriptures, but the law only. Here the evidence is contradictory, and we have to determine, whether Aristobulus or Josephus be most worthy of credit. We do not mean, however, to accuse either of forgery, but only to inquire which had the best opportunities of knowing the truth. Aristobulus was an Alexandrian Jew, tutor to an Egyptian king, and lived within 100 years after the translation was made, and certainly had access to see it in the royal library. Josephus was a native of Palestine, and lived not until 300 years or more after the translation was made, and many years after it was burnt along with the whole library of Alexandria in the wars of Julius Cæsar. Supposing the veracity of these two writers equal, as we have no proof of the contrary, which of them ought we to consider as the best evidence? Aristobulus surely. Prideaux, indeed, seems doubtful whether there was ever such a man; and Dr. Hody supposes that the commentaries on the five books of Moses, which bear the name of Aristobulus, were a forgery of the second century. To prove the existence of any human being, who lived 2000 years before us, and did not perform such works as no mere man ever performed, is a task which we are not disposed to undertake; and we believe it would not be less difficult to prove that Philo and Josephus existed, than that such a person as Aristobulus did not exist. If the writings which have passed under his name were a forgery of the second century, it is surprising that they should have imposed upon Clemens Alexandrinus, who lived in the same century, and was a man of abilities, learning, and well acquainted with the writings of the ancients. Eusebius, too, in his Præp. Evan. quotes the commentaries of Aristobulus. But, continues the learned Dean, "Clemens Alexandrinus is the first author that mentions them. Now, had any such commentaries existed in the time of Philo and Josephus, they would surely have mentioned them. But is the circumstance of its not being quoted by every succeeding author a sufficient reason to disprove the authenticity of any book? Neither Philo nor Josephus undertook to give a list of preceding authors, and it was by no means the uniform practice of these times always to name the authors from whom they derived their information."

4. Prideaux further contends that the sum which Ptolemy is said to have given to the interpreters is too great to be credible. If his computation were just, it certainly would be so. He makes it 2,000,000l. sterling, but other writers reduce it to 85,421 l. and some to 56,947l.; neither of which is a sum so very extraordinary in so great and magnificent a prince as Philadelphus, who spent, according to a passage in Athenæus (lib. v.), no less than 10,000 talents on the furniture of one tent; which is six times more than what was spent in the whole of the embassy and translation, which amounted only to 1552 talents.

5. Prideaux says, "that what convicts the whole story of Aristæas of falsity is, that he makes Demetrius Phalereus to be the chief actor in it, and a great favourite of the king; whereas Philadelphus, as soon as his father was dead, cast him into prison, where he soon after died." But it may be replied, that Philadelphus reigned two years jointly with his father Lagus, and it is not said by Hermippus that Demetrius was out of favour with Philadelphus during his father's life. Now, if the Septuagint was translated in the beginning of the reign of Philadelphus, as Eusebius and Jerome think, the difficulty will be removed. Demetrius might have been librarian during the reign of Philadelphus, and yet imprisoned on the death of Lagus. Indeed, as the cause of Philadelphus's displeasure was the advice which Demetrius gave to his father, to prefer the sons of Arsinoe before the son of Berenice, he could scarcely show it till his father's death. The Septuagint translation might therefore be begun while Philadelphus reigned jointly with his father, but not be finished till after his father's death.

6. Besides the objections which have been considered, there is only one that deserves notice. The ancient Christians not only differ from one another concerning the time in which Aristobulus lived, but even contradict themselves in different parts of their works. Sometimes they tell us, he dedicated his book to Ptolemy Philometer, at other times they say, it was addressed to Philadelphus and his father. Sometimes they make him the same person who is mentioned in 2 Maccabees, chap. 1. and sometimes one of the 72 interpreters 152 years before. It is difficult to explain how authors fall into such inconsistencies, but it is probably occasioned by their quoting from memory. This was certainly the practice of almost all the early Christian writers, and sometimes of the apostles themselves. Mistakes were therefore inevitable. Josephus has varied in the circumstances of the same event, in his antiquities and wars of the Jews, probably from the same cause; but we do not hence conclude, that every circumstance of such a relation is entirely false. In the account of the marquis of Argyle's death in the reign of Charles II. we have a very remarkable contradiction. Lord Clarendon relates, that he was condemned to be hanged, which was performed the same day: on the contrary, Burnet, Woodrow, Heath, Echard, concur in stating, that he was beheaded; and that he was condemned upon the Saturday and executed upon the Monday. Was any reader of English history ever sceptic enough to raise from hence a question, whether the marquis of Argyle was executed or not? Yet this ought to be left in uncertainty according to the way of reasoning in which the facts respecting the

translation of the Septuagint are attempted to be disproved.

Such are the objections which the learned and ingenious Prideaux has raised against the common account of the Septuagint translation, and such are the answers which may be given to them. We have chosen to support that opinion which is sanctioned by historical evidence, in preference to the conjectures of modern critics however ingenious; being persuaded, that there are many things recorded in history, which, though perfectly true, yet, from our imperfect knowledge of the concomitant circumstances, may, at a distant period, seem liable to objections. To those who require positive evidence, it may be stated thus. Aristæas, Aristobulus, Philo, and Josephus, assure us that the law was translated. Taking the law in the most restricted sense, we have at least sufficient authority to assert that the Pentateuch was rendered into Greek under Ptolemy Philadelphus. Aristobulus affirms that the whole Scriptures were translated by the 72. Josephus confines their labours to the books of Moses. He therefore who cannot determine to which of the two the greatest respect is due, may suspend his opinion. It is certain, however, that many of the other books were translated before the age of our Saviour; for they are quoted both by him and his apostles: and, perhaps, by a minute examination of ancient authors, in the same way that Dr. Lardner has examined the Christian fathers to prove the antiquity of the New Testament, the precise period in which the whole books of the Septuagint were composed might, with considerable accuracy, be ascertained.

For 400 years this translation was in high estimation with the Jews. It was read in their synagogues in preference to the Hebrew; not only in those places where Greek was the common language, but in many synagogues of Jerusalem and Judæa. But when they saw that it was equally valued by the Christians, they became jealous of it, and at length, in the second century, Aquila, an apostate Christian, attempted to substitute another Greek translation in its place. In this work he was careful to give the ancient prophecies concerning the Messiah a different turn from the Septuagint, that they might not be applicable to Christ. In the same design he was followed by Symmachus and Theodotion, who also, as St. Jerome informs us, wrote out of hatred to Christianity.

In the mean time, the Septuagint, from the ignorance, boldness, and carelessness of transcribers, became full of errors. To correct these, Origen published a new edition in the beginning of the third century, in which he placed the translations of Aquila, Symmachus, and Theodotion. This edition was called Tetrapla, the translations being arranged opposite to one another in four columns. He also added one column, containing the Hebrew text in Hebrew letters, and another exhibiting it in Greek. In a second edition he published two additional Greek versions; one of which was found at Nicopolis, and the other at Jericho: this was called the Hexapla. By comparing so many translations, Origen endeavoured to form a correct copy of the Scriptures. Where they all agreed, he considered them right. The passages which he found in the LXX, but not in the Hebrew text, he marked with an obelisk: what he found in the Hebrew, but not in the LXX, he marked with an asterisk. St. Jerome says that the additions which Origen made to the LXX, and marked with an asterisk, were taken from Theodotion. From this valuable work of Origen the version of the LXX was transcribed in a separate volume, with the asterisks and obelisks for the use of the churches; and from this circumstance the great work itself was neglected and lost.

About the year 300 two new editions of the LXX were published; the one by Hesychius an Egyptian bishop, and the other by Lucian a presbyter of Antioch. But as these authors did not mark with any note of distinction the alterations which they had made, their edition does not possess the advantages of Origen's.

The best edition of the LXX is that of Dr. Grabe, which was published in the beginning of the present century. He had access to two MSS. nearly of equal antiquity, the one found in the Vatican library at Rome, the other in the Royal library at St. James's, which was presented to Charles I. by Cyril, patriarch of Alexandria, and hence is commonly called the Alexandrine MS. Anxious to discover which of these was according to the edition of Origen, Dr. Grabe collected the fragments of the Hexapla, and found they agreed with the Alexandrine MS. but not with the Vatican where it differed with the other. Hence he concluded that the Alexandrine MS. was taken from the edition of Origen. By comparing the quotations from scripture in the works of Athanasius and St. Cyril (who were patriarchs of Alexandria at the time St. Jerome says Hesychius's edition of the LXX was there used) with the Vatican MS. he found they agreed so well that he justly inferred that that MS. was taken from the edition of Hesychius. This version was in use to the time of our blessed Saviour, and is that out of which most of the citations in the New Testament, from the Old, are taken. It was also the ordinary and canonical translation made use of by the Christian church in the earliest ages; and it still subsists in the churches both of the east and west.

Those who desire a more particular account of the Septuagint translations may consult Hody de Bibliorum Textibus, Prideaux's Connections, Owen's Inquiry into the Septuagint Version, Blair's Lectures on the Canon, Michaelis's Introduction to the New Testament, last edition, and Dr. A. Clarke's Bibliographical Dictionary, vol. i. pa. 234—239.

SEPTUAGINT CHRONOLOGY, the chronology which is formed from the dates and

periods of time mentioned in the Septuagint translation of the Old Testament. It reckons 1500 years more from the creation to Abraham than the Hebrew bible. Dr. Kennicot, in the dissertation prefixed to his Hebrew Bible, has shown it to be very probable that the chronology of the Hebrew scriptures, since the period just mentioned, was corrupted by the Jews, between the years 175 and 200, and that the chronology of the Septuagint is more agreeable to truth. It is a fact, that during the second and third centuries the Hebrew scriptures were almost entirely in the hands of the Jews, while the Septuagint was confined to the Christians. The Jews had therefore a very favourable opportunity for this corruption. The following is the reason which is given by oriental writers: it being a very ancient tradition, that the Messiah was to come in the sixth chiliad, because he was to come in the last days (founded on a mystical application of the six days creation), the contrivance was to shorten the age of the world from about 5500 to 3760; and thence to prove that Jesus could not be the Messiah. Dr. Kennicot adds, that some Hebrew copies having the larger chronology were extant till the time of Eusebius, and some till the year 700.

SEPTUM. (from *sepio*, to inclose.) In anatomy, a partition or division in an organ.

SEPTUM CEREBELLI. A process of the dura mater, dividing the cerebellum perpendicularly into two principal parts.

SEPTUM CEREBRI. The falciform process of the dura mater is sometimes so called. See FALCIFORM PROCESS.

SEPTUM CORDIS. (from *sepio*, to separate.) The partition between the two ventricles of the heart.

SEPTUM LUCIDUM. Septum pellucidum. The thin and tender portion of the brain dividing the lateral ventricles from each other.

SEPTUM NARIUM. The partition between the nostrils.

SEPTUM PELLUCIDUM. See SEPTUM LUCIDUM.

SEPTUM THORACIS. See MEDIASTINUM.

SEPTUM TRANSVERSUM. See DIAPHRAGM.

SE'PTUPLE. *a.* (*septuplex*, Latin.) Seven times as much.

SEPU'LCHRAL. *a.* (*sepulchral*, French; *sepulchralis*, Latin.) Relating to burial; relating to the grave; monumental (*Donne*).

SE'PULCHRE. *s.* (*sepulcre*, Fr. *sepulchrum*, Lat.) A grave; a tomb (*Dryden*).

To SE'PULCHRE. *v. a.* (from the noun.) To bury; to entomb (*Prior*).

SEPULCHRE (Regular Canons of St.), a religious order, formerly instituted at Jerusalem, in honour of the holy sepulchre, or the tomb of Jesus Christ. Many of these canons were brought from the Holy Land into Europe, particularly into France, by Louis the Younger; into Poland, by Jaxa, a Polish gentleman; and into Flanders, by the counts thereof: many also came into England. This order was, however, suppressed by pope Innocent VIII. who gave its revenues and effects to that of our Lady of Bethlehem: which also becoming extinct, they were bestowed on the knights of St. John of Jerusalem.

SEPULCHRE (Knights of the Holy), a military order, established in Palestine about the year 1114. The knights of this order in Flanders chose Philip II. king of Spain, for their master, in 1558, and afterwards his son; but the grand-master of the order of Malta prevailed on the last to resign; and when afterwards the duke of Nevers assumed the same quality in France, the same grand-master, by his interest and credit, procured a like renunciation of him, and a confirmation of the union of this order to that of Malta.

SE'PULTURE. *s.* (*sepulture*, Fr. *sepultura*, Lat.) Interment; burial (*Dryden*).

SEQUA'CIOUS. *a.* (*sequacis*, Latin.) 1. Following; attendant (*Dryden*). 2. Ductile; pliant (*Ray*).

SEQUA'CITY. *s.* (from *sequax*, Latin.) Ductility; toughness (*Bacon*).

SE'QUEL. *s.* (*sequelle*, Fr. *sequela*, Latin.) 1. Conclusion; succeeding part (*South*). 2. Consequence; event (*Milton*). 3. Consequence inferred; consequentialness (*Whitgift*).

SE'QUENCE. *s.* (from *sequor*, Latin.) 1. Order of succession (*Shakspeare*). 2. Series; arrangement; method (*Bacon*).

SEQUENCE, in music, a regular alternate succession of similar chords: as when in the common chord the note which makes the fifth to the bass is changed to the sixth, and after making a fifth to the succeeding bass note, is again changed to the sixth, and so on.

SE'QUENT. *a.* (*sequens*, Latin.) 1. Following; succeeding (*Milton*). 2. Consequential.

SE'QUENT. *s.* (from the adjective.) A follower: not used (*Shakspeare*).

SEQUENTIA. (Lat.) Certain hymns used in the Romish church, otherwise called *prosæ*, i. e. proses, because though in their composition rhyme is adhered to, the laws of measure and quantity established by the ancient Greeks and Romans are neglected. These hymns are always sung after the Introitus, whence their name of sequentia. Of this kind is the stabet mater.

SEQUENZA. An hymn formerly sung in the Romish service after the Gradual, immediately before the Gospel, and sometimes in the vespers before the Magnificat.

To SEQUE'STER. *v. a.* (*sequestrer*, Fr. *sequestro*, low Latin.) 1. To separate from others for the sake of privacy (*Milton*). 2. To put aside; to remove (*Bacon*). 3. To withdraw; to segregate (*Hooker*). 4. To set aside from the use of the owner to that of others. 5. To deprive of possessions (*South*).

SEQUE'STRABLE. *a.* (from *sequestrate*.) 1. Subject to privation. 2. Capable of separation (*Boyle*).

To SEQUE'STRATE. *v. a.* To sequester; to separate (*Arbuthnot*).

SEQUESTRA'TION. *s.* (*sequestration*, French.) 1. Separation; retirement (*South*). 2. Disunion; disjunction (*Boyle*). 3. State of being set aside (*Shakspeare*). 4. Deprivation of the use and profits of a possession.

SEQUESTRATION is the separating or setting aside of a thing in controversy from the possession of both those who contend for it. And it is of two kinds, voluntary, or necessary: voluntary is that which is done by consent of each party; necessary is that which the judge does of his authority, whether the parties will or not. It is used also for the act of the ordinary disposing of the goods and chattels of one deceased, whose estate no man will meddle with. A sequestration is also a kind of execution for debt, especially in the case of a beneficed clerk, of the profits of the benefices, to be paid over to him that had the judgment till the debt is satisfied.

SEQUESTRATION, in the civil law, is used in various senses: it is taken for the act of the ordinary in disposing of the goods of a deceased person, which nobody will meddle with. A widow is said to sequester, when she disclaims having any thing to do with the estate of her deceased husband. Sequestration is also used to signify the gathering up the fruits of a vacant benefice, for the use of the next incumbent of the church.

SEQUESTRA'TOR. *s.* (from *sequestrate*.) One who takes from a man the profit of his possessions (*Taylor*).

SEQUIN, a gold coin, struck at Venice, and in several parts of the grand signior's dominions. In Turkey its value is about 6*s*. 3*d*. English; but it varies considerably in different countries.

SERA, or SIRA, a town of Hindustan, in Mysore, with a stone fort of a good size. It is the principal place in the central division of the rajah's dominions N. of the Cavery, and carries on a considerable inland commerce. The chief products sent hence are cocoa-nuts, sugar, betle-nuts, bark, lac, steel, oxen, buffalos, butter, and oil. The whole of the cloth made here is used in the neighbourhood. Since the restoration of the rajah, in 1799, the fort has been garrisoned by British troops. It is 48 miles S.E. of Chitteldroog, and 84 N. of Seringapatam. Lon. 76. 53 E. Lat. 13. 36 N.

SERAGLIO, formed from the Persian word *seraw*, or Turkish word *sarai*, which signifies a house, and is commonly used to express the house or palace of a prince. In this sense it is frequently used at Constantinople: the houses of foreign ambassadors are called seraglios. But it is commonly used by way of eminence for the palace of the grand signior at Constantinople, where he keeps his court, and where his concubines are lodged, and where the youth are trained up for the chief posts of the empire.

It is a triangle about three Italian miles round, wholly within the city, at the end of the promontory Chrysoceras, now called the Seraglio Point. The buildings run back to the top of the hill, and from thence are gardens that reach to the edge of the sea. It is inclosed with a very high and strong wall, upon which there are several watch-towers: and it has many gates, some of which open toward the sea-side, and the rest into the city; but the chief gate is one of the latter, which is constantly guarded by a company of capoochees, or porters; and in the night it is well guarded towards the sea. The outward appearance is not very beautiful, the architecture being irregular, consisting of separate edifices in the form of pavilions and domes.

The ladies of the seraglio are a collection of beautiful young women, chiefly sent as presents from the provinces and the Greek islands, most of them the children of Christian parents. The brave prince Heraclius however some years ago abolished the infamous tribute of children of both sexes, which Georgia formerly paid every year to the Porte. The number of women in the harem depends on the taste of the reigning monarch or sultan. Selim had 2000, Achmet had but 300, and the late sultan had nearly 1600. On their admission they are committed to the care of old ladies, taught sewing and embroidery, music, dancing, and other accomplishments, and furnished with the richest clothes and ornaments. They all sleep in separate beds, and between every fifth there is a preceptress. Their chief governess is called Katon Kiaga, or governess of the noble young ladies. There is not one servant among them, for they are obliged to wait on one another by rotation; the last that is entered serves her who preceded her and herself. These ladies are scarcely ever suffered to go abroad, except when the grand signior removes from one place to another, when a troop of black eunuchs convey them to the boats, which are inclosed with lattices and linen curtains. In short, these unfortunate creatures are considered as the mere instruments of pleasure; and are, in fact, the most abject of slaves, slaves to the vices, the licentiousness, and the fancy of a capricious tyrant.

SERAI, a town of European Turkey, capital of Bosnia, and the see of a catholic bishop, appointed by the king of Hungary. It is large and commercial, and seated on the river Bosna, 130 miles S.W. of Belgrade. Lon. 19. 15 E. Lat. 44. 14 N.

SERAPH, or SERAPHIM, in the hierarchy of angels, a spirit supposed to be of the first or highest rank.

The seraphs, or rather seraphim, make that class of angels, supposed to be the most inflamed with divine love, by their nearer and more immediate attendance on the throne, and to communicate their heat to the inferior, and remoter orders: hence their name, which is formed from the Hebrew root שרף, to burn, inflame.

SERAPH is also said to be the name of a Turkish gold coin, worth about 5*s*. sterling.

SERAPHIC, something belonging to the seraphim.

Mr. Boyle has a treatise of seraphic love, i. e. of divine love, or the love of God.

In the schools, St. Bonaventure is called the Seraphic Doctor, from his abundant zeal and fervor.

St. Francis, founder of the Cordeliers and Franciscans, is called the Seraphic Father, in memory of a vision he saw on mount Alverna.

SERAPHIM. See SERAPH.

SERAPIAS. Helleborine. In botany, a genus of the class gynandria, order diandria. Nectary ovate, gibbous underneath, with an ovate lip. Fourteen species, natives of Europe chiefly, a few of Barbary, the West Indies, or Polynesia: six indigenous to the woods or marshes of our own country.

SERAPINUM. The gum resin sagapenum is sometimes so called. See SAGAPENUM.

SERAPIS, one of the Egyptian deities, supposed to be the same as Osiris. He had a magnificent temple at Memphis, another at Alexandria, and a third at Canopus. The worship of Serapis was introduced at Rome, by the emperor Antoninus Pius, A. D. 146; but on account of its licentiousness, it was soon after abolished, and the mysteries celebrated on the 6th of May, but with so much licentiousness, that the senate were soon after obliged to abolish it. Herodotus makes no mention of the god Serapis. Apollodorus says it is the same as the bull Apis.

SERE. *a.* (reajian, Saxon, to dry.) Dry; withered; no longer green (*Milton*).

SERENADE. A concert performed at night in the open air, and under the windows of the party it is designed to entertain. This word, Italian in its origin, seems to be derived from *sereno*, or from the Latin *serum*, in the evening. When the concert is performed in the morning, or at break of day, it is called an aubade.

To SERENA'DE. *v. a.* (from the noun.) To entertain with nocturnal music (*Spectator*).

SERENATA. A vocal composition on an amorous subject, consisting of chorusses, solos, duets, trios, &c. Handel's Acis and Galatea, and Doctor Boyce's Solomon, are serenatas.

SERE'NE. *a.* (*serein*, Fr. *serenus*, Lat.) 1. Calm; placid; quiet (*Pope*). 2. Unruffled; undisturbed; even of temper; showing a calm mind (*Milton*).

SERENE HIGHNESS, SERENE MAJESTY, titles of honour given to several princes and chief magistrates.

SERE'NE. *s.* (from the adjective.) A calm damp evening (*Ben Jonson*).

To SERE'NE. *v. a.* (*serener*, French; *sereno*, Latin.) 1. To calm; to quiet. 2. To clear; to brighten. Improper (*Philips*).

SERE'NELY. *ad.* (from *serene.*) 1. Calmly; quietly (*Pope*). 2. With unruffled temper; coolly (*Locke*).

SERE'NENESS. *s.* (from *serene.*) Serenity.

SERE'NITUDE. *s.* (from *serene.*) Calmness; coolness of mind: not in use (*Wotton*).

SERE'NITY. *s.* (*serenité*, Fr.) 1. Calmness; mild temperature (*Bentley*). 2. Peace; quietness; not disturbance (*Tem.*). 3. Evenness of temper; coolness of mind (*Locke*).

SERFO, or SERFANTE, an island of the Archipelago, 50 miles N.W. of Naxia. It is eight miles long and five broad, and full of mountains and rocks, in which are mines of iron and loadstone. The inhabitants are all Greeks, and have but one town, called St. Nicholo, which is a poor place. Lon. 25. 10 E. Lat. 37. 19 N.

SERGE, in commerce, a woollen stuff manufactured in a loom, of which there are various kinds, denominated either from their different qualities, or from the places where they are wrought; the most considerable of which is the English serge, which is highly valued abroad, and of which a manufacture had been for some years carried on in France.

In the manufacture of serges, the longest wool is chosen for the warp, and the shortest for the woof. But before either kind is used, it is first scoured, by putting it in a copper of liquor, somewhat more than luke-warm, composed of three parts of fair water and one of urine. After it has staid in it long enough for the liquor to take off the grease, &c. it is stirred briskly about with a wooden peel, taken out, drained, washed in a running water, and dried in the shade; beaten with sticks on a wooden rack, to drive out the coarser dust and filth; and then picked clean with the hands. It is then greased with oil of olives, and the longest wool combed with large combs, heated in a little furnace for that purpose: to clear it from the oil, it is put into a vessel of hot soap-water, whence being taken out, wrung, and dried, it is spun on the wheel. As to the shorter wool, intended for the woof, it is only carded on the knee with small fine cards, and then spun on the wheel, without being scoured of its oil: and here it is to be observed, that the thread for the warp is always to be spun finer, and much better twisted, than that of the woof.

The wool both for the warp and woof being spun, and the thread reeled into skeins; that of the woof is put on spools, fit for the cavity of the shuttle; and that for the warp is wound on a kind of wooden bobbins, to fit it for warping; and when warped, it is stiffened with a size, usually made of the shreds of parchment; and, when dried, put into the loom, and mounted so as to be raised by four treddles, placed under the loom, which the workman makes to act transversely, equally, and alternately, one after another, with his feet; and as the threads are raised, throws the shuttle. See WEAVING.

The serge, on being taken from the loom, is carried to the fuller, who fulls or scours it, in the trough of his mill, with fullers-earth: and after the first fulling, the knots, ends, straws, &c. sticking out on either side of the surface, are taken off with a kind of pliers, or iron pincers, after which it is returned into

the fulling-trough, where it is worked with water somewhat more than lukewarm, with soap dissolved therein for near two hours: it is then washed out till such time as the water becomes quite clear, and there be no signs of soap left; then it is taken out of the trough, the knots, &c. again pulled off, and then put on the tenter to dry, taking care as fast as it dries to stretch it out both in length and breadth till it be brought to its just dimensions. When well dried, it is taken off the tenter, and dyed, shorn, and pressed.

SERGEANT, or SERJEANT AT LAW, or of the Coif, is the highest degree taken at the common law, as that of Doctor is of the civil law; and as these are supposed to be the most learned and experienced in the practice of the courts, there is one court appointed for them to plead in by themselves, which is the common pleas, where the common law of England is most strictly observed: but they are not restricted from pleading in any other court, where the judges, who cannot have that honour till they have taken the degree of serjeant at law, call them brothers.

SERGEANT AT ARMS, or MACE, an officer appointed to attend the person of the king; to arrest traitors, and such persons of quality as offend; and to attend the lord high steward, when sitting in judgment on a traitor. Of these, by statute 13 Rich. II. cap. 6. there are not to be above 30 in the realm. There are now nine at court at 100*l.* per annum salary each: they are called the king's sergeants at arms, to distinguish them from others: they are created with great ceremony; the person kneeling before the king, his majesty lays the mace on his right shoulder, and says, "Rise up sergeant at arms and esquire for ever." They have, besides, a patent for the office, which they hold for life. They have their attendance in the presence-chamber, where the band of gentlemen-pensioners wait; and, receiving the king at the door, they carry the maces before him to the chapel door, whilst the band of pensioners stand foremost, and make a lane for the king, as they also do when the king goes to the house of lords.

There are four other sergeants at arms, created in the same manner; one, who attends the lord chancellor; a second, the lord treasurer; a third, the speaker of the house of commons; and a fourth, the lord mayor of London on solemn occasions. They have a considerable share of the fees of honour, and travelling charges allowed them when in waiting, viz. five shillings per day when the court is within ten miles of London, and ten shillings when twenty miles from London. The places are in the lord chamberlain's gift.

There are also sergeants of the mace of an inferior kind, who attend the mayor or other head officer of a corporation.

SERGEANT (Common), an officer in the city of London, who attends the lord mayor and court of aldermen on court days, and is in council with them on all occasions, within and without the precincts or liberties of the city. He is to take care of orphans estates, either by taking account of them, or to sign their indentures, before their passing the lord mayor and court of aldermen: and he was likewise to let and manage the orphans estates, according to his judgment, to their best advantage. See RECORDER.

SERGEANT, or SERJEANT, in war, is an inferior officer in a company of foot, or troop of dragoons, armed with a halberd, and appointed to see discipline observed, to teach the soldiers the exercise of their arms, and to order, straighten, and form, ranks, files, &c.

SERJEANTY, signifies in law a service that cannot be due from a tenant to any lord, but to the king only; and it is either grand serjeanty or petit serjeanty.

Grand serjeanty is a tenure whereby a person holds his lands of the king by such services as he ought to do in person; as to carry the king's banner, or his lance, or to carry his sword before him at his coronation, or to do other like services; and it is called grand serjeanty, because it is a more worthy service than the service in the common tenure of escuage.

Petit serjeanty is where a person holds his land of the king, to furnish him yearly with some small thing towards his wars, as a bow, lance, &c. And such service is but socage in effect, because such tenant by his tenure ought not to go nor do any thing in his proper person.

SERGIPPY, a province on the coast of Brasil, to the S. of Fernambuco. It produces sugar and tobacco in considerable quantities, and has some silver mines.

SERGIPPY, a seaport of Brasil, capital of the province of the same name; seated at the mouth of the Sergippy, 120 miles N.E. of St. Salvador. Lon. 27. 44 W. Lat. 12. 10 S.

SERIANA, in botany, a genus of the class octandria, order trigynia. Calyx five-leaved; petals four; nectary four-leaved; capsules three, longitudinally united, globular, dilated below into a membranaceous wing. Ten species, natives of the West Indies and America.

SERICEOUS LEAF, in botany. A silky leaf. Tectum pilis appressis mollissimis. Covered with very soft hairs pressed close to the surface.

SE'RIES. *s.* (*series*, Latin.) 1. Sequence; order (*Ward*). 2. Succession; course (*Pope*).

SERIES, in algebra, denotes a rank or progression of quantities or terms, which usually proceed according to some certain law.

As the series $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \&c.$

or the series $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \&c.$

where the former is a geometrical series, each term being a third of the one immediately preceding; and the latter is an harmonical series, being the reciprocals of the arithmetical series 1, 2, 3, 4, &c.

The only traces of the doctrine of series we find among the ancients are in the works of Archimedes and Pappus. Thus, in comparing the spheroid with the cone and cylinder, Archimedes supposes the terms of a progression to increase constantly

by the same difference, and demonstrates several properties of such a progression relating to the sum of the terms, and the sum of their squares; by means of which he compares the parabolic conoid, the spheroid, and hyperbolic conoid, with the cone, and the area of his spiral line with the area of the circle. Again, in his treatise on the quadrature of the parabola, he mentions a progression whose terms decrease constantly in the proportion of four to one; but he does not suppose this progression to be continued to infinity, or mention the sum of an infinite number of terms; though it is manifest that all which can be understood by those who assign that sum was fully known to him. He contents himself, however, with demonstrating this plain property of such a series, that the sum of the terms continued at pleasure, added to the third part of the last term, amounts always to $\frac{4}{3}$ of the first term. See Archim. Quad. Parab. Pr. 23.

Pappus touches upon a subject nearly allied to the modern doctrine of series, in the 4th book of his Mathematical Collections, where he treats of the general problem which relates to an infinite series of circles inscribed in the space called arbelon contained between the circumferences of two circles touching inwardly. But both Archimedes and Pappus investigate their respective problems geometrically, and without any reference to the algebraic method.

With regard to series considered algebraically, the first glimpses are in the works of Dr. Wallis. Thus, in his Arithmetical Works, published in 1657, he for the first time reduced the fraction $\frac{A}{1-R}$ by a perpetual division into an infinite series $A + AR + AR^2 + AR^3 + AR^4 +$ &c. This, and a few other deductions of similar import, gave the idea to Nicholas Mercator, who made some advances in the doctrine. It was afterwards taken up by Brouncker, James Gregory, &c.; but the genius of Newton first gave it body and form. As this is one of the most important and fertile branches of the modern analysis, we shall deem no apology necessary for assigning it a greater portion here than we usually allot to our mathematical articles.

It is chiefly useful in the quadrature of curves; where, as we often meet with quantities which cannot be expressed by any precise definite numbers, such as is the ratio of the diameter of a circle to the circumference, we are glad to express them by a series, which, infinitely continued, is the value of the quantity sought, and which is called an infinite series.

The Nature, Origin, &c. of Series.

Infinite series commonly arise, either from a continued division, as was practised by Mercator, or the extraction of roots, as first performed by Newton, who also explained other general ways for the expanding of quantities into infinite series, as by the binomial theorem. Thus, to divide 1 by 3, or to expand the fraction $\frac{1}{3}$ into an infinite series; by division in decimals in the ordinary way, the series is 0·3333, &c. or $\frac{3}{10} + \frac{3}{100} + \frac{3}{1000} + \frac{3}{10000}$, &c. where the law of continuation is manifest. Or, if the same fraction $\frac{1}{3}$ be set in this form $\frac{1}{2+1}$, and division be performed in the algebraic manner, the quotient will be

$$\frac{1}{3} = \frac{1}{2+1} = \frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \frac{1}{16} + \frac{1}{32} \text{ &c.}$$

Or, if it be expressed in this form $\frac{1}{3} = \frac{1}{4-1}$, by a like division there will arise the series,

$$\frac{1}{3} = \frac{1}{4} + \frac{1}{16} + \frac{1}{64} \text{ &c.} = \frac{1}{4} + \frac{1}{4^2} + \frac{1}{4^3} \text{ &c.}$$

And, thus, by dividing 1 by 5—2, or 6—3, or 7—4, &c. the series answering to the fraction $\frac{1}{3}$, may be found in an endless variety of infinite series; and the finite quantity $\frac{1}{3}$ is called the value or radix of the series, or also its sum, being the number or sum to which the series would amount, or the limit to which it would tend or approximate, by summing up its terms, or by collecting them together one after another.

In like manner, by dividing 1 by the algebraic sum $a+c$, or by $a-c$, the quotient will be in these two cases, as below, viz.

$$\frac{1}{a+c} = \frac{1}{a} - \frac{c}{a^2} + \frac{c^2}{a^3} - \frac{c^3}{a^4} \text{ &c.}$$

$$\frac{1}{a-c} = \frac{1}{a} + \frac{c}{a^2} + \frac{c^2}{a^3} + \frac{c^3}{a^4} \text{ &c.}$$

where the terms of each series are the same, and they differ only in this, that the signs are alternately positive and negative in the former, but all positive in the latter.

And hence, by expounding a and c by any numbers whatever, we obtain an endless variety of infinite series, whose sums or values are known. So, by taking a or c equal to 1 or 2 or 3 or 4, &c. we obtain these series, and their values;

$$\frac{1}{1+1} = \frac{1}{2} = 1 - 1 + 1 - 1 + 1 - 1 \text{ &c.}$$

$$\frac{1}{3-1} = \frac{1}{2} = \frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \frac{1}{3^4} \text{ &c.}$$

$$\frac{1}{4-2} = \frac{1}{2} = \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} \text{ &c.}$$

$$\frac{1}{2+1} = \frac{1}{3} = \frac{1}{2} - \frac{1}{2^2} + \frac{1}{2^3} - \frac{1}{2^4} \text{ &c.}$$

$$\frac{1}{1+2} = \frac{1}{3} = 1 - 2 + 2^2 - 2^3 \text{ &c.}$$

$$\frac{1}{3+1} = \frac{1}{4} = \frac{1}{3} - \frac{1}{3^2} + \frac{1}{3^3} - \frac{1}{3^4} \text{ &c.}$$

$$\frac{1}{5-1} = \frac{1}{4} = \frac{1}{5} + \frac{1}{5^2} + \frac{1}{5^3} + \frac{1}{5^4} \text{ &c.}$$

And hence it appears, that the same quantity or radix may be expressed by a great variety of infinite series, or that many different series may have the same radix or sum.

Another way in which an infinite series arises is by the extraction of roots. Thus, by extracting the square root of the number 3 in the common way, we obtain its value in a series as follows, viz. $\sqrt{3} = 1{\cdot}73205$ &c. $= 1 + \frac{7}{10} + \frac{3}{100} + \frac{2}{1000} + \frac{5}{100000}$ &c.

in which way of resolution the law of the progression of the series is not visible, as it is when found by division. But the square root of the algebraic quantity $a^2 + c^2$ gives

$$\sqrt{a^2+c^2} = a + \frac{c^2}{2a} - \frac{c^4}{8a^3} + \frac{c^6}{16a^5} \text{ &c.}$$

And a 3d way is by Newton's binomial theorem, which is a universal method, that serves for all sorts of quantities, whether fractional or radical ones: and by this means the same root of the last given quantity becomes $\sqrt{a^2 + c^2} =$

$$= a + \frac{c^2}{2a} - \frac{1.c^4}{2.4a^3} + \frac{1.3c^6}{2.4.6a^5} + \frac{1.3.5c^8}{2.4.6.8a^7} \text{ &c.}$$

where the law of continuation is visible.

See EXTRACTION OF ROOTS, and BINOMIAL THEOREM.

From the specimens above given, it appears that the signs of the terms may be either all plus, or alternately plus and minus. Though they may be varied in many other ways. It also appears that the terms may be either continually smaller and smaller, or larger and larger, or else all equal. In the first case therefore the series is said to be a decreasing one, in the 2d case an increasing one, and in the 3d case an equal one. Also the first series is called a converging one, because that by collecting its terms successively, taking in always one term more, the successive sums approximate or converge to the value or sum of the whole infinite series. So, in the series

$$\frac{1}{3-1} = \frac{1}{2} = \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} \text{ &c.}$$

the first term $\frac{1}{3}$ is too little, or below $\frac{1}{2}$ which is the value or sum of the whole infinite series proposed; the sum of the first two terms $\frac{1}{3} + \frac{1}{9}$ is $\frac{4}{9} = .4444$ &c. is also too little, but nearer to $\frac{1}{2}$ or .5 than the former; and the sum of three terms $\frac{1}{3} + \frac{1}{9} + \frac{1}{27}$ is $\frac{13}{27} = .481481$ &c. is nearer than the last, but still too little; and the sum of four terms

$$\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} \text{ is } \frac{40}{81} = .493827 \text{ &c.}$$

which is again nearer than the former, but still too little; which is always the case when the terms are all positive. But when the converging series has its terms alternately positive and negative, then the successive sums are alternately too great and too little, though still approaching nearer and nearer to the final sum or value. Thus in the series

$$\frac{1}{3+1} = \frac{1}{4} = 0.25 = \frac{1}{3} - \frac{1}{9} + \frac{1}{27} - \frac{1}{81} \text{ &c.}$$

the 1st term $\frac{1}{3} = .333$ &c. is too great,

two terms $\frac{1}{3} - \frac{1}{9} = .222$ &c. are too little,

three terms $\frac{1}{3} - \frac{1}{9} + \frac{1}{27} = .259259$ &c. are too great, four terms $\frac{1}{3} - \frac{1}{9} + \frac{1}{27} - \frac{1}{81} = .246913$ &c. are too little and so on, alternately too great and too small, but every succeeding sum still nearer than the former, or converging.

In the second case, or when the terms grow larger and larger, the series is called a diverging one, because that by collecting the terms continually, the successive sums diverge, or go always farther and farther from the true value or radix of the series; being all too great when the terms are all positive, but alternately too great and too little when they are alternately positive and negative. Thus, in the series

$$\frac{1}{1+2} = \frac{1}{3} = 1-2+4-8 \text{ &c.}$$

the first term + 1 is too great,
two terms $1-2 = -1$ are too little,
three terms $1-2+4 = +3$ are too great,
four terms $1-2+4-8 = -5$ are too little,

and so on continually, after the 2d term, diverging more and more from the true value or radix $\frac{1}{3}$, but alternately too great and too little, or positive and negative. But the alternate sums would be always more and more too great if the terms were all positive, and always too little if negative.

But in the third case, or when the terms are all equal, the series of equals, with alternate signs, is called a neutral one, because the successive sums, found by a continual collection of the terms, are always at the same distance from the true value or radix, but alternately positive and negative, or too great and too little. Thus, in the series

$$\frac{1}{1+1} = \frac{1}{2} = 1-1+1-1+1-1 \text{ &c.}$$

the first term 1 is too great,
two terms $1-1 = 0$ are too little,
three terms $1-1+1 = 1$ too great,
four terms $1-1+1-1 = 0$ too little,

and so on continually, the successive sums being alternately 1 and 0, which are equally different from the true value or radix $\frac{1}{2}$, the one as much above it, as the other below it.

A series may be terminated and rendered finite, and accurately equal to the sum or value, by assuming the supplement, after any particular term, and combining it with the foregoing terms. So, in the series $\frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \frac{1}{16}$ &c. which is equal to $\frac{1}{3}$, and found by dividing 1 by 2+1, after the first term, $\frac{1}{2}$, of the quotient, the remainder is $-\frac{1}{2}$, which divided by 2+1, or 3, gives $-\frac{1}{6}$ for the supplement, which combined with the first term $\frac{1}{2}$ gives $\frac{1}{2} - \frac{1}{6} = \frac{1}{3}$ the true sum of the series.

Again, after the first two terms $\frac{1}{2} - \frac{1}{4}$, the remainder is $+\frac{1}{4}$, which divided by the same divisor 3, gives $\frac{1}{12}$ for the supplement, and this combined with those two terms $\frac{1}{2} - \frac{1}{4}$, makes $\frac{1}{2} - \frac{1}{4} + \frac{1}{12} = \frac{1}{4} + \frac{1}{2} = \frac{4}{12}$ or $\frac{1}{3}$ the same sum or value as before. And in general, by dividing 1 by $a+c$, there is obtained

$$\frac{1}{a+c} = \frac{1}{a} - \frac{c}{a^2} + \frac{c^2}{a^3} \text{ ---- } \pm \frac{c^n}{a^{n+1}} \mp$$

$\frac{c^{n+1}}{a^{n+1}(a+c)}$; where, stopping the division at any term as $\frac{c^n}{a^{n+1}}$, the remainder after this term is $\frac{c^{n+1}}{a^{n+1}}$, which being divided by the same divisor $a+c$, gives $\frac{c^{n+1}}{a^{n+1}(a+c)}$ for the supplement as above.

The Law of Continuation.—A series being proposed, one of the chief questions concerning it, is to find the law of its continuation. Indeed, no universal rule can be given for this; but it often happens that the terms of the series, taken two and two, or three and three, or in greater numbers, have an obvious and simple relation, by which the series may be determined and produced indefinitely. Thus, if 1 be divided by $1-x$, the quotient will be a geometrical progression, viz. $1+x+x^2+x^3$ &c. where the succeeding terms are produced by the continual multiplication by x. In like manner, in other cases of division, other progressions are produced.

But in most cases the relation of the terms of a series is not constant, as it is in those that arise by division. Yet their relation often varies according to a certain law, which is sometimes obvious on inspection, and sometimes it is found by dividing the successive terms one by another, &c. Thus, in the series

$$1+\frac{2}{3}x+\frac{8}{15}x^2+\frac{16}{35}x^3+\frac{128}{315}x^4 \text{ \&c.}$$

by dividing the 2d term by the 1st, the 3d by the 2d, the 4th by the 3d, and so on, the quotients will be

$$\frac{2}{3}x,\ \frac{4}{5}x,\ \frac{6}{7}x,\ \frac{8}{9}x, \text{ \&c;}$$

and therefore the terms may be continued indefinitely by the successive multiplication by these fractions. Also in the following series

$$1+\frac{1}{6}x+\frac{3}{40}x^2+\frac{5}{128}x^3+\frac{35}{1152}x^4 \text{ \&c.}$$

by dividing the adjacent terms successively by each other, the series of quotients is

$$\frac{1}{6}x,\ \frac{9}{20}x,\ \frac{25}{42}x,\ \frac{49}{72}x, \text{ \&c. or}$$

$$\frac{1\cdot1}{2\cdot3}x,\ \frac{3\cdot3}{4\cdot5}x,\ \frac{5\cdot5}{6\cdot7}x,\ \frac{7\cdot7}{8\cdot9}x, \text{ \&c.;}$$

and therefore the terms of the series may be continued by the multiplication of these fractions.

Another method of expressing the law of a series, is one that defines the series itself, by its general term, shewing the relation of the terms generally by their distances from the beginning, or by differential equations. To do this, Mr. Stirling conceives the terms of the series to be placed as so many ordinates on a right line given by position, taking unity as the common interval between these ordinates. The terms of the series he denotes by the initial letters of the alphabet, A, B, C, D, &c.; A being the first, B the second, C the third, &c.: and he denotes any term in general by the letter T, and the rest following it in order by T′, T″, T‴, T⁗, &c.; also the distance of the term T from any given term, or from any given intermediate point between two terms, he denotes by the indeterminate quantity z: so that the distances of the terms T′, T″, T‴, &c. from the said term or point, will be $z+1$, $z+2$, $z+3$, &c.; because the increment of the abscis is the common interval of the ordinates, or terms of the series, applied to the abscis.

These things being premised, let this series be proposed, viz.

$$1,\ \frac{1}{2}x,\ \frac{3}{8}x^2,\ \frac{5}{16}x^3,\ \frac{35}{128}x^4,\ \frac{63}{256}x^5, \text{ \&c.;}$$

in which it is found, by dividing the terms by each other, that the relations of the terms are,

$$B=\frac{1}{2}Ax,\ C=\frac{3}{4}Bx,\ D=\frac{5}{6}Cx,\ E=\frac{7}{8}Dx, \text{\&c;}$$

then the relation in general will be defined by the equation $T'=\frac{2z+1}{2z+2}Tx$ or $\frac{z+\frac{1}{2}}{z+1}Tx$, where z denotes the distance of T from the first term of the series. For by substituting 0, 1, 2, 3, 4, &c. successively instead of z, the same relations will arise as in the proposed series above. In like manner, if z be the distance of T from the 2d term of the series, the equation will be $T'=\frac{2z+3}{2z+4}Tx$ or $\frac{z+\frac{3}{2}}{z+2}Tx$, as will appear by substituting the numbers -1, 0, 1, 2, 3, &c. successively for z. Or, if z denote the place or number of the term T in the series, its successive values will be 1, 2, 3, 4, &c. and the equation or general term will be $T'=\frac{2z-1}{2z}Tx$.

It appears therefore, that innumerable differential equations may define one and the same series, according to the different points from whence the origin of the abscis z is taken. And, on the contrary, the same equation defines innumerable different series, by taking different successive values of z. For in the equation $T'=\frac{2z-1}{2z}Tx$, which defines the foregoing series when 1, 2, 3, 4, &c. are the successive values of the abscisses; if $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$, &c. be successively substituted for z, the relations of the terms arising will be,

$$B=\frac{2}{3}Ax,\ C=\frac{4}{5}Bx,\ D=\frac{6}{7}Cx, \text{ \&c. from whence}$$

will arise the series

$$A,\ \frac{2}{3}Ax,\ \frac{8}{15}Ax^2,\ \frac{16}{35}Ax^3,\ \frac{128}{315}Ax^4, \text{ \&c. which is}$$

different from the former.

And thus the equation will always determine the series from the given values of the abscis and of the first term, when the equation includes but two terms of the series, as in the last example, where the first term being given, all the rest will be given.

But when the equation includes three terms, then two must be given; and three must be given when it includes four; and so on. So, if there be proposed the series $x,\ \frac{1}{6}x^3,\ \frac{3}{40}x^5,\ \frac{5}{128}x^7,\ \frac{35}{1152}x^9,$ &c. where the relations of the terms are,

$$B=\frac{1\cdot1}{2\cdot3}Ax^2,\ C=\frac{3\cdot3}{4\cdot5}Bx^2,\ D=\frac{5\cdot5}{6\cdot7}Cx^2, \text{ \&c. the}$$

equation defining this series will be

$$T'=\frac{\overline{2z-1}\cdot\overline{2z-1}}{2z\cdot\overline{2z+1}}Tx^2=\frac{4zz-4z+1}{4zz+2z}Tx^2,$$

where the successive values of z are 1, 2, 3, 4, &c. See Stirling's Methodus Differentialis, in the introduction.

This may suffice to give a notion of these differential equations, defining the nature of series. But as to the application of these equations in interpolations, and finding the sums of series, it would require a treatise to explain it. We must therefore refer to that excellent one just quoted, as also to De Moivre's Miscellanea Analytica; and several curious papers by Euler in the Acta Petropolitana.

A series often converges so slowly, as to be of no use in practice. Thus, if it were required to find the sum of the series

$$\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+\frac{1}{7.8}+\frac{1}{9.10}\ \&c.$$

which lord Brouncker found for the quadrature of the hyperbola, true to 9 figures, by the mere addition of the terms of the series; Mr. Stirling computes that it would be necessary to add a thousand millions of terms for that purpose; for which the life of man would be too short. But by that gentleman's method, the sum of the series may be found by a very moderate computation. See Method. Differ. pa. 26.

Series are of various kinds or descriptions. So,

An Ascending Series, is one in which the powers of the indeterminate quantity increase; as

$$1+ax+bx^2+cx^3\ \&c.$$ And a

Descending Series, is one in which the powers decrease, or else increase in the denominators, which is the same thing; as

$$1+ax^{-1}+bx^{-2}+cx^{-3}\ \&c.\ \text{or}\ 1+\frac{a}{x}+\frac{b}{x^2}+\frac{c}{x^3}\ \&c.$$

A Circular Series, which denotes a series whose sum depends on the quadrature of the circle. Such is the series $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}$ &c. See Demoivre Miscel. Analyt. pa. 111, or Hutton's Mensur. Or the sum of the series $1+\frac{1}{4}+\frac{1}{9}+\frac{1}{16}+\frac{1}{25}$ &c. continued ad infinitum, according to Euler's discovery.

Continued Fraction or Series, is a fraction of this kind, to infinity,

$$\cfrac{a}{b+\cfrac{c}{d+\cfrac{e}{f+\cfrac{g}{h\ \&c.}}}}$$

The first series of this kind was given by lord Brouncker, first president of the Royal Society, for the quadrature of the circle, as related by Dr. Wallis, in his Algebra, pa. 317. His series is

$$1+\cfrac{1}{2+\cfrac{9}{2+\cfrac{25}{2+\cfrac{49}{2+\cfrac{81}{2+\&c.}}}}}$$

which denotes the ratio of the square of the diameter of a circle to its area. Euler has treated on this kind of series, in the Petersburgh Commentaries, vol. 11, and in his Analys. Infinit. vol. 1. pa. 295, where he shews various uses of it, and how to transform ordinary fractions and common series into continued fractions. A common fraction is transformed into a continued one, after the manner of seeking the greatest common measure of the numerator and denominator, by dividing the greater by the less, and the last divisor always by the last remainder. Thus to change $\frac{1461}{59}$ to a continued fraction.

```
59) 1461 (24
    118
    ---
    281
    236
    ---
     45) 59 (1
         45
         --
         14) 45 (3
             42
             --
              3) 14 (4
                 12
                 --
                  2) 3 (1
                     2
                     -
                     1) 2 (2
                        2
                        -
                        0
```

$$\text{Theref.}\ \frac{1461}{59}=24+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{2}}}}.$$

$$\text{Also}\ \sqrt{2}=1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2}}}}\ \&c.$$

Converging Series, is a series whose terms continually decrease, or the successive sums of whose terms approximate or converge always nearer to the ultimate sum of the whole series. And, on the contrary, a

Diverging Series, is one whose terms continually increase, or that has the successive sums of its terms diverging, or going off always the farther, from the sum or value of the series.

Determinate Series, is a series whose terms proceed by the powers of a determinate quantity; as

$$1+\frac{1}{2}+\frac{1}{2^2}+\frac{1}{2^3}+\&c.$$ If that determinate quantity be unity, the series is said to be determined by unity. De Moivre, Miscel. Analyt. pa. 111. And an

Indeterminate Series is one whose terms proceed by the powers of an indeterminate quantity x; as

$$x+\frac{1}{2}x^2+\frac{1}{3}x^3+\frac{1}{4}x^4\ \&c.$$ or sometimes also with indeterminate exponents, or indeterminate coefficients.

The Form of a Series, is used for that affection of an indeterminate series, such as

$$ax^n+bx^{n+r}+cx^{n+2r}+dx^{n+3r}\ \&c.$$ which arises from the different values of the indices of x. Thus,

If $n=1$, and $r=1$, the series will take the form
$$ax+bx^2+cx^3+dx^4\ \&c.$$
If $n=1$, and $r=2$, the form will be
$$ax+bx^3+cx^5+dx^7\ \&c.$$
If $n=\frac{1}{2}$, and $r=1$, the form is
$$ax^{\frac{1}{2}}+bx^{\frac{3}{2}}+cx^{\frac{5}{2}}+dx^{\frac{7}{2}}\ \&c.$$ And
If $n=0$, and $r=-1$, the form will be
$$a+bx^{-1}+cx^{-2}+dx^{-3}\ \&c.$$

When the value of a quantity cannot be found exactly, it is of use in algebra, as well as in common arithmetic, to seek an approximate value of that quantity, which may be useful in practice.

Thus, in arithmetic, as the true value of the square root of 2 cannot be assigned, a decimal fraction is found to a sufficient degree of exactness in any particular case; which decimal fraction is in reality no more than an infinite series of fractions converging or approximating to the true value of the root sought. For the expression $\sqrt{2}=1.414213$, &c. is equivalent to this $\sqrt{2}=1+\frac{4}{10}+\frac{1}{100}+\frac{4}{1000}$ &c. or supposing $x=10$, to this

$$\sqrt{2}=1+\frac{4}{x}+\frac{1}{x^2}+\frac{4}{x^3}+\frac{2}{x^4}\text{ &c.}$$

$$\text{or }=1+4x^{-1}+x^{-2}+4x^{-3}+2x^{-4}\text{ &c.}$$

which last series is a particular case of the more general indeterminate series $ax^n+bx^{n+r}+cx^{n+2r}$ &c. viz. when $n=0$, $r=-1$, and the coefficients $a=1$, $b=4$, $c=1$, $d=4$ &c.

But the application of the notion of approximations in numbers, to species, or to algebra, is not so obvious. Newton, with his usual sagacity, took the hint, and prosecuted it; by which were discovered general methods in the doctrine of infinite series, which had before been treated only in a particular manner, though with great acuteness, by Wallis and a few others. See Newton's Method of Fluxions and Infinite Series, with Colson's Comment; as also the Analysis per Æquationes Numero Terminorum Infinitas, published by Jones in 1711, and since translated and explained by Stewart, together with Newton's Tract on Quadratures, in 1745. To these may be added Maclaurin's Algebra, part 2, chap. 10. pa. 244; and Cramer's Analyse des Lignes Courbes Algebraiques, chap. 7. pa. 148; and many other authors.

Among the various methods for determining the value of a quantity by a converging series, that seems preferable to the rest, which consists in assuming an indeterminate series as equal to the quantity whose value is sought, and afterwards determining the values of the terms of this assumed series. For instance, suppose a logarithm were given, to find the natural number answering to it. Suppose the logarithm to be z, and the corresponding number sought $1+x$: then by the nature of logarithms and fluxions, $\dot{z}=\frac{\dot{x}}{1+x}$, or $\dot{z}+x\dot{z}=\dot{x}$.

Now assume a series for the value of the unknown quantity x, and substitute it and its fluxion instead of x and $\dot{x}$ in the last equation, then determine the assumed coefficients by comparing or equating the like terms of the equation. Thus,

assume $x=az+bz^2+cz^3+dz^4$ &c.

then $\dot{x}=a\dot{z}+2bz\dot{z}+3cz^2\dot{z}+4dz^3\dot{z}$ &c.

and $\dot{x}=(\dot{z}+x\dot{z})=\dot{z}+az\dot{z}+bz^2\dot{z}+cz^3\dot{z}$ &c.

hence, comparing the like terms of these two values of $\dot{x}$, there arises $a=1$, $b=\frac{1}{2}$, $c=\frac{1}{6}$, $d=\frac{1}{24}$, &c.; which values being substituted for a, b, c, &c. in the assumed series $ax+bx^2+cx^3$ &c. it gives

$$x=z+\frac{1}{2}z^2+\frac{1}{6}z^3+\frac{1}{24}z^4+\frac{1}{120}z^5\text{, &c. or}$$

$$x=z+\frac{1}{1.2}z^2+\frac{1}{1.2.3}z^3+\frac{1}{1.2.3.4}z^4+\frac{1}{1.2.3.4.5}z^5$$

&c. and consequently the number sought will be

$$1+x=1+z+\frac{1}{1.2}z^2+\frac{1}{1.2.3}z^3\text{ &c.}$$

But the indeterminate series $az+bz^3+cz^5$ &c. was here assumed arbitrarily, with regard to its exponents 1, 2, 3, &c. and will not succeed in all cases, because some quantities require other forms for the exponents. For instance, if from an arc given, it were required to find the tangent. Let $x=$ the tangent, and z the arc, the radius being $=1$. Then, from the nature of the circle we shall have $\frac{\dot{x}}{1+x^2}=\dot{z}$, or $\dot{x}=\dot{z}+x^2\dot{z}$. Now if, to find the value of x, we suppose $x=az+bz^2+cz^3$ &c. and proceed as before, we shall find all the alternate coefficients b, d, f, &c. or those of the even powers of z, to be each $=0$; and therefore the series assumed is not of a proper form. But supposing $x=az+bz^3+cz^5+dz^7$, &c. then we find $a=1$, $b=\frac{1}{3}$, $c=\frac{2}{15}$, $d=\frac{17}{315}$, &c. and consequently $x=z+\frac{1}{3}z^3+\frac{1}{15}z^5+\frac{17}{315}z^7$ &c. And other quantities require other forms of series.

Now to find a proper indeterminate series in all cases, tentatively, would often be very laborious, and even impracticable. Mathematicians have therefore endeavoured to find out a general rule for this purpose; though till lately the method has been but imperfectly understood and delivered. Most authors indeed have explained the manner of finding the coefficients a, b, c, d, &c. of the indeterminate series $ax^n+bx^{n+r}+cx^{n+2r}$ &c. which is easy enough; but the values of n and r, in which the chief difficulty lies, have been assigned by many in a manner as if they were self-evident, or at least discoverable by an easy trial or two, as in the last example.

As to the number n, Newton himself has shewn the method of determining it, by his rule for finding the first term of a converging series, by the application of his parallelogram and ruler. For the particulars of this method, see the authors above cited.

Taylor, in his Methodus Incrementorum, investigates the number r; but Stirling observes that his rule sometimes fails. Lineæ Tert. Ordin. Newton, pa. 28. Mr. Stirling gives a correction of Taylor's rule, but says he cannot affirm it to be universal, having only found it by chance. And again

Gravesande observes, that though he thinks Stirling's rule never leads into an error, yet that it is not perfect. See Gravesande, De Determin. Form. Seriei Infinit. printed at the end of his Matheseos Universalis Elementa. This learned professor has endeavoured to rectify the rule. But Cramer has shewn that it is still defective in several respects; and he himself, to avoid the inconveniences to which the methods of former authors are subject, has had recourse to the first principles of the method of infinite series, and has entered into a more exact and instructive detail of the whole method than is to be met with elsewhere; for which reason, and many others, his treatise deserves to be particularly recommended to beginners.

But it is to be observed, that in determining the value of a quantity by a converging series, it is not always necessary to have recourse to an indeterminate series; for it is often better to find it by division, or by extraction of roots. See Newton's Meth. of Flux. and Inf. Series, above cited. Thus, if it were required to find the arc of a circle from its given tangent, that is, to find the value of

z in the given fluxional equation, $\dot{z}=\frac{\dot{x}}{1+xx}$, by an infinite series: dividing $\dot{x}$ by $1+xx$, the quotient will be the series $\dot{x}-x^2\dot{x}+x^4\dot{x}-x^6\dot{x}$ &c. $=\dot{z}$; and taking the fluents of the terms, there results $z=x-\frac{1}{3}x^3+\frac{1}{5}x^5-\frac{1}{7}x^7$ &c. which is the series often used for the quadrature of the circle. If $x=1$, or the tangent of 45°, then will $z=1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}$ &c. = the length of an arc of 45°, or $\frac{1}{8}$ of the circumference, to the radius 1, or $\frac{1}{4}$ of the circumference to the diameter 1. Consequently, if 1 be the diameter, then $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}$ &c. will be the area of the circle, because $\frac{1}{4}$ of the circumference multiplied by the diameter, gives the area of the circle. And this series was first given by Leibnitz and James Gregory.

See the form of the series for the binomial theorem, determined, both as to the coefficients and exponents, in vol. i. Hutton's 8vo Tracts.

Harmonical Series, the reciprocal of arithmeticals. See HARMONICAL.

Hyperbolic Series, is used for a series whose sum depends upon the quadrature of the hyperbola. Such is the series $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}$ &c. De Moivre's Miscel. Analyt. pa. 111.

Interpolation of Series, the inserting of some terms between others, &c. See INTERPOLATION.

Interscendent Series. See INTERSCENDENT.

Mixt Series, one whose sum depends partly on the quadrature of the circle, and partly on that of the hyperbola. De Moivre, Miscel. Analyt. pa. 111.

Recurring Series, is used for a series which is so constituted, that having taken at pleasure any number of its terms, each following term shall be related to the same number of preceding terms according to a constant law of relation. Thus, in the following series,

$$\begin{array}{cccccc} a & b & c & d & e & f \\ 1+2x+3x^2+10x^3+34x^4+97x^5 \text{ &c.} \end{array}$$

in which the terms being respectively represented by the letters a, b, c, &c. set over them, we shall have

$$\begin{aligned} d&=3cx-2bx^2+5ax^3, \\ e&=3dx-2cx^2+5bx^3, \\ f&=3ex-2dx^2+5cx^3, \\ &\text{&c. &c.} \end{aligned}$$

where it is evident that the law of relation between d and e, is the same as between e and f, each being formed in the same manner from the three terms which precede it in the series.

The quantities $3x-2x^2+5x^3$, taken together and connected by their proper signs, form what De Moivre calls the index, or the scale of relation; though sometimes the bare coefficients $3-2+5$ are called the scale of relation. And the scale of relation subtracted from unity, is called the differential scale. On the subject of recurring series, see De Moivre's Miscel. Analyt. pa. 27 and 72, and his Doctrine of Chances, 3d edit. pa. 220; also Euler's Analys. Infinit. tom. 1, pa. 175; and Wood's Algebra, pa. 239.

Having given a recurring series, with its scale of relation, the sum of the whole infinite series will also be given. For instance, suppose a series $a+bx+cx^2+dx^3$ &c. where the relation between the coefficient of any term and the coefficients of any two preceding terms may be expressed by $f-g$; that is, $e=fd-gc$, and $d=fc-gb$, &c.; then will the sum of the series, infinitely continued, be $\frac{a+(b-fa)x}{1-fx+gx^2}$.

Thus, for example, assume 2 and 5 for the coefficients of the first two terms of a recurring series; and suppose f and g to be respectively 2 and 1; then the recurring series will be

$$2+5x+8x^2+11x^3+14x^4+18x^5 \text{ &c.}$$

and its sum $=\frac{2+5x-4x}{1-2x+xx}=\frac{2+x}{(1-x)^2}$. For the proof of which divide $2+x$ by $(1-x)^2$, and there arises the said series $2+5x+8x^2+11x^3$ &c. And similar rules might be derived for more complex cases.

De Moivre's general rule is this: 1. Take as many terms of the series as there are parts in the scale of relation. 2. Subtract the scale of relation from unity, and the remainder is the differential scale. 3. Multiply the terms taken in the series by the differential scale, beginning at unity, and so proceeding orderly, remembering to leave out what would naturally be extended beyond the last of the terms taken. Then will the product be the numerator, and the differential scale will be the denominator of the fraction expressing the sum required.

But it must here be observed, that when the sum of a recurring series extended to infinity, is found by De Moivre's rule, it ought to be supposed that the series converges indefinitely, that is, that the terms may become less than any assigned quantity. For if the series diverge, that is, if its terms continually increase, the rule does not give the true sum. For the sum in such case is infinite, or greater than any given quantity, whereas the sum exhibited by the rule will often be finite. The rule therefore in this case only gives a fraction expressing the radix of the series, by the expansion of which the series is produced.

Summable Series, is one whose sum can be accurately found. Such is the series $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$ &c. the sum of which is said to be unity, or, to speak more accurately, the limit of its sum is unity or 1.

An indefinite number of summable infinite series may be assigned: such are, for instance, all infinite recurring converging series, and many others, for which, consult De Moivre, Bernoulli, Stirling, Euler, and Maclaurin; viz. Miscel. Analyt. pa. 110; De Serieb. Infinit. passim; Method. Differ. pa. 34; Acta Petrop. passim; Fluxions, art. 350.

The obtaining the sums of infinite serieses of fractions has been one of the principal objects of the modern method of computation; and these sums may often be found, and often not. Thus the sums of the two following series of geometrical progressionals are easily found to be 1 and $\frac{1}{2}$,

$$\text{viz. } 1=\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16} \text{ &c.}$$

$$\text{and } \frac{1}{2}=\frac{1}{3}+\frac{1}{9}+\frac{1}{27}+\frac{1}{81} \text{ &c.}$$

But the serieses of fractions that occur in the solution of problems can seldom be reduced to geometric progressions; nor can any general rule, in cases so infinitely various, be given. The art here, as in most other cases, is only to be acquired by examples, and by a careful observation of the arts used by great authors in the investigation of such series of fractions as they have considered. And the general methods of infinite series, which have been carried so far by De Moivre, Stirling, Euler, &c. are often found necessary to determine the sum of a very simple series of fractions. See the quotations above.

The sum of a series of fractions, though decreasing continually, is not always finite. This is the case of the series $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}$ &c. which is the harmonic series, consisting of the reciprocals of arithmeticals, the sum of which exceeds any given number whatever; and this is shewn from the analogy between this progression and the space comprehended by the common hyperbola and its asymptote; though the same may be shewn also from the nature of progressions. See James Bernoulli, de Seriebus Infin. But, what is curious, the square of it is finite, for if the same terms of the harmonic series, $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}$ &c. be squared, forming the series $\frac{1}{1}+\frac{1}{4}+\frac{1}{9}$ &c. being the reciprocals of the squares of the natural series of numbers; the sum of this series of fractions will not only be limited, but it is remarkable that this sum will be precisely equal to the 6th part of the number which expresses the ratio of the square of the circumference of a circle to the square of its diameter. That is, if c denote 3·14159 &c. the ratio of the circumference to the diameter, then is $\frac{1}{6}c^2=\frac{1}{1}+\frac{1}{4}+\frac{1}{9}+\frac{1}{16}+\frac{1}{25}$ &c. This property was first discovered by Euler; and his investigation may be seen in the Acta Petrop. vol. 7. Maclaurin has since observed, that this may easily be deduced from his Fluxions, art. 822. Philos. Trans. numb. 469.

It would require a whole treatise to enumerate the various kinds of series of fractions which may or may not be summed. Sometimes the sum cannot be assigned, either because it is infinite, as in the harmonic series $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}$ &c. or although its sum be finite (as in the series $\frac{1}{1}+\frac{1}{4}+\frac{1}{9}$ &c.) yet its sum cannot be assigned in finite terms, or by the quadrature of the circle or hyperbola, which was the case of this series before Euler's discovery; but yet the sum of any given number of the terms of the series may be expeditiously found, and the whole sum may be assigned by approximation, independent of the circle. See Stirling's Method. Different. and De Moivre's Miscel. Analyt.

Besides the serieses of fractions, the sums of which converge to a certain quantity, there sometimes occur others, which converge by a continued multiplication. Of this kind is the series found by Wallis, for the quadrature of the circle, which he expresses thus,

$$\square=\frac{3\times3\times5\times5\times7\times7\times9\times9\times\&c}{2\times4\times4\times6\times6\times8\times8\times10\times\&c},$$

where the character $\square$ denotes the ratio of the square of the diameter to the area of the circle. Hence the denominator of this fraction, is to its numerator, both infinitely continued, as the circle is to the square of the diameter. It may farther be observed that this series is equivalent to

$$\frac{9}{8}\times\frac{25}{24}\times\frac{49}{48}\times\ \&c.\ \text{or to}\ \frac{3^2}{3^2-1}\times\frac{5^2}{5^2-1}\times\frac{7^2}{7^2-1}\times$$

&c. that is, the product of the squares of all the odd numbers 3, 5, 7, 9, &c. is to the product of the same squares severally diminished by unity, as the square of the diameter is to the area of the circle. See Arithmet. Infinit. prop. 191, Oper. vol. 1. pa. 469. Id. Oper. vol. 2. pa. 819. And these products of fractions, and the like quantities arising from the continued multiplication of certain factors, have been particularly considered by Euler, in his Analysis Infinit. vol. 1. chap. 15. pa. 221.

For an easy and general method of summing all alternate series, such as $a-b+c-d$ &c. see Hutton's Tracts, vol. 1. 8vo. and in the same vol. may be seen many other curious tracts on infinite series. See also Hutton's Math. Dict.

Summation of Infinite Series, is the finding the value of them, or the radix from which they may be raised.

To find an infinite series by extracting of roots; and to find an infinite series by a presupposed series; see QUADRATURE OF THE CIRCLE.

Mr. professor Vince of Cambridge gave, in the 72d volume of the Philosophical Transactions, a very valuable paper on investigating the sums of infinite series, a summary of which we are persuaded will be acceptable to our mathematical readers. It is divided into three parts. The first contains a new and general method of finding the sum of those series which De Moivre has found in one or two particular cases; but whose method, though it be in appearance general, will on trial be found to be absolutely impracticable. The second contains the summation of certain series, the last differences of whose numerators become equal to nothing. The third contains observations on a correction which is necessary in investigating the sums of certain series by collecting two terms into one, with its application to a variety of cases.

We must, however, content ourselves with a very abridged state of this paper; retaining only a few specimens of the several ingenious methods abovementioned; and besides, altering a little the notation of some of the characters or ligatures, for the greater ease and simplicity in printing.

PART I.—LEM. I. Let r be any whole number; then the fluent of $\frac{\dot{x}}{1+x^r}$ can always be exhibited by circular arcs and logarithms; but when $x=1$, the fluent of the same fluxion will be expressed by the infinite series

$$1-\frac{1}{r+1}+\frac{1}{2r+1}-\frac{1}{3r+1}+\ \&c.$$

the sum of this series therefore can always be found by circular arcs and logarithms.

LEM. 2. To find the sum of the infinite series

$$\frac{a}{1\,.\,r+1}-\frac{a+b}{r+1\,.\,2r+1}+\frac{a+2b}{2r+1\,.\,3r+1}-\ \&c.$$

Assume $1-\frac{1}{r+1}+\frac{1}{2r+1}-\frac{1}{3r+1}+\ \&c.\ldots=s$;

then by several algebraical processes, Mr. V. finds the sum required to be as follows: viz. $\frac{a}{1.r+1} - \frac{a+b}{r+1.2r+1} + \frac{a+2b}{2r+1.3r+1} -$ &c. $= \frac{(2ra-(r+2)b)\times s - ra + (r+1)b}{r^2}$.

Cor. 1. Hence it appears that the sum of this series can never be exhibited in finite terms, except $a:b$ as $r+2:2r$, in which case the sum is equal to $\frac{a}{r+2}$.

Hence, if $a=3$, $b=2$, then $r=1$; $\therefore \frac{3}{1.2} - \frac{5}{2.3} + \frac{7}{3.4} -$ &c. $= 1$.

If $a=1$, $b=4$, then $r=\frac{4}{3}$; $\therefore \frac{5}{3.7} - \frac{9}{7.11} + \frac{13}{11.15} - \frac{17}{15.19} +$ &c. $= \frac{1}{6}$.

If $a=4$, $b=3$, then $r=\frac{6}{5}$; $\therefore \frac{4}{5.11} - \frac{7}{11.17} + \frac{10}{17.23} - \frac{13}{23.29} +$ &c. $= \frac{1}{20}$.

Prop. 1.—To find the sum of $\frac{m}{1.r+1.2r+1} + \frac{m+n}{r+1.3r+1.4r+1} + \frac{m+2n}{4r+1.5r+1.6r+1} +$ &c.

Every series of this kind may be resolved into the following series, $\frac{a}{1.r+1} - \frac{a+b}{r+1.2r+1} + \frac{a+2b}{2r+1.3r+1} - \frac{a+3b}{3r+1.4r+1} +$ &c. for if we reduce two terms of this series into one, it will become $\frac{2ar-b}{1.r+1.2r+1} + \frac{2ra+(2r-1)b}{2r+1.3r+1.4r+1} + \frac{2ra+(4r-1)b}{4r+1.5r+1.6r+1} +$ &c. where the denominators being the same as in the given series, and the numerators also in arithmetic progression, we have only to take a and b such quantities that the respective numerators may be also equal; assume therefore $2ra-b=m$, $2ra+(2r-1)b=m+n$; therefore, $b=\frac{n}{2r}$, $a=\frac{2rm+n}{4r^2}$, which substituted for a and b in Lem. 2. gives $\frac{m}{1.r+1.2r+1} + \frac{m+n}{2r+1.3r+1.4r+1} + \frac{m+2n}{4r+1.5r+1.6r+1} +$ &c. $= \frac{2rm-(r+1)n}{2r^3}\times s + \frac{(2r+1)n-2rm}{4r^3}$.

Let $r=1$, and we have $\frac{m}{1.2.3} + \frac{m+n}{3.4.5} + \frac{m+2n}{5.6.7} +$ &c. $= (m-n)s + \frac{3n-2m}{4}$.

If $m=1$, $n=3$, $\frac{1}{1.2.3} + \frac{4}{3.4.5} + \frac{7}{5.6.7} +$ &c. $= \frac{7}{4} - 2s$;

If $m=1$, $n=0$ $\frac{1}{1.2.3} + \frac{1}{3.4.5} + \frac{1}{5.6.7} +$ &c. $= s - \frac{1}{2}$.

If $m=1$, $n=1$, $\frac{1}{1.6.11} + \frac{2}{11.16.21} + \frac{3}{21.26.31} +$ &c. $= \frac{2}{125}\times s + \frac{1}{500}$;

If $m=1$, $n=0$, $\frac{1}{1.6.11} + \frac{1}{11.16.21} + \frac{1}{21.26.31} +$ &c. $= \frac{8}{25} - \frac{1}{50}$.

Cor. If $2r:r+1::n:m$, the sum of the series can be accurately found, and will be equal to $\frac{m}{2r(r+1)}$. Let therefore $m=r+1$, and then $n=2r$, consequently $\frac{1}{1.2r+1} + \frac{1}{2r+1.4r+1} + \frac{1}{4r+1.6r+1} +$ &c. $= \frac{1}{2r}$; which is also known from other principles.

Prop. 2.—To find the sum of $\frac{m}{r+1.2r+1.3r+1} + \frac{m+n}{3r+1.4r+1.5r+1} + \frac{m+2n}{5r+1.6r+1.7r+1} +$ &c. Proceeding much in the same manner as in prob. 1. Mr. V. finds that the sum of this infinite series is equal to $\frac{(2r+1)n-2rm}{2r^3}\times s + \frac{2rm-(3r+1)n}{4r^3} + \frac{2rm-(r-1)n}{4r^2.r+1}$.

Cor. In prop. 1, substitute a for m, and $2b$ for n, and we have $\frac{a}{1.r+1.2r+1} + \frac{a+2b}{2r+1.3r+1.4r+1} + \frac{a+4b}{4r+1.5r+1.6r+1} +$ &c. $= \frac{ra-(r+1)b}{r^3}\times s + \frac{(2r+1)b-ra}{2r^3}$.

Also in this prop. substitute $a+b$ for m, and $2b$ for n, and we have $\frac{a+b}{r+1.2r+1.3r+1} + \frac{a+3b}{3r+1.4r+1.5r+1} +$ &c. $= \frac{(r+1)b-ra}{r^3}\times s + \frac{ra-(2r+1)b}{2r^3} + \frac{ra+b}{2r^2\times(r+1)}$.

Subtract this latter series from the former, and then $\frac{a}{1.r+1.2r+1} - \frac{a+b}{r+1.2r+1.3r+1} + \frac{a+2b}{2r+1.3r+1.4r+1} -$ &c. $= \frac{2ra-(r+1)2b}{r^3}\times s + \frac{(2r+1)b-ra}{r^3} - \frac{ra+2b}{2r^2\times(r+1)}$.

Let $r=1$, and we have $\frac{a}{1.2.3} - \frac{a+b}{2.3.4} + \frac{a+2b}{3.4.5} -$ &c. $= (2a-4b)\times s + \frac{11b-5a}{4}$.

If $a=1$, $b=0$, $\frac{1}{1.2.3}-\frac{1}{2.3.4}+\frac{1}{3.4.5}-$

&c. $=2s-\frac{5}{4}$;

If $a=1$, $b=2$, $\frac{1}{1.2.3}-\frac{3}{2.3.4}+\frac{5}{3.4.5}-$

&c. $=\frac{17}{4}-6s$.

PROP. 3.—To find the sum of the infinite series $\frac{m}{1.r+1.2r+1.3r+1}+\frac{m+n}{2r+1.3r+1.4r+1.5r+1}$

$+\frac{m+2n}{4r+1.5r+1.6r+1.7r+1}+$ &c. By a similar process Mr. V. finds the sum of this infinite series will be generally expressed by $\frac{4rm-(3+2)n}{6r^4}$

$\times s+\frac{(3r+1)n-2rm}{6r^4}-\frac{rm+n}{6r^3.(r+1)}$.

Let $r=1$, and we have $\frac{m}{1.2.3.4}+\frac{m+n}{3.4.5.6}$

$+\frac{m+2n}{5.6.7.8}+$ &c. $=\frac{4m-5n}{6}\times s+\frac{7n-5m}{12}$.

If $m=1$, $n=1$, $\frac{1}{1.2.3.4}+\frac{1}{3.4.5.6}+$

$\frac{1}{5.6.7.8}+$ &c. $=\frac{2}{3}s-\frac{5}{12}$;

If $m=1$, $n=1$, $\frac{1}{1.2.3.4}+\frac{2}{3.4.5.6}+\frac{3}{5.6.7.8}+$

&c. $=\frac{1}{6}-\frac{1}{6}s$;

If $m=7$, $n=5$, $\frac{7}{1.2.3.4}+\frac{12}{3.4.5.6}+\frac{17}{5.6.7.8}+$

&c. $=\frac{1}{2}s$;

Cor. If $n:m$ as $4r:3r+2$, the sum of the series can be accurately had; let therefore $n=4r$ and $m=3r+2$, and we shall have

$\frac{3r+2}{1.r+1.2r+1.3r+1}+\frac{7r+2}{2r+1.3r+1.4r+1.5r+1}$

$+$ &c. $=\frac{1}{2r.r+1}$.

If $r=1$, $\frac{5}{1.2.3.4}+\frac{9}{3.4.5.6}+\frac{13}{5.6.7.8}+$

&c. $=\frac{1}{4}$;

If $r=2$, $\frac{1}{1.3.5.7}+\frac{2}{5.7.9.11}+\frac{3}{9.11.13.15}+$

&c. $=\frac{1}{96}$;

If $r=6$, $\frac{5}{1.7.13.19}+\frac{11}{13.19.25.31}+$

$\frac{17}{25.31.37.43}+$ &c. $=\frac{1}{336}$.

PROP. 4.—To find the sum of the infinite series $\frac{m}{r+1.2r+1.3r+1.4r+1}+$

$\frac{m+n}{3r+1.4r+1.5r+1.6r+1}+$

$\frac{m+2n}{5r+1.6r+1.7r+1.8r+1}+$ &c.

By a like process also Mr. V. finds that this series is $=\frac{(5r+2)n-4rm}{6r^4}\times s+\frac{2rm-(4r+1)n}{6r^4}$

$+\frac{2rm-(r-2)n}{12.r^3(r+1)}+\frac{4rm-(2r-1)n}{12r^2(r+1).(2r+1)}$

Cor. 1. By a like process also it is found that $\frac{a}{1.r+1.2r+1.3r+1}-\frac{a+b}{r+1.2r+1.3r+1.4r+1}$

$+$ &c. $=\frac{4ra-(3r+2)2b}{3r^4}\times s+\frac{(3r+1)2b-2ra}{3r^4}$

$-\frac{ra+2b}{r^3(r+1)}-\frac{2ra+b}{6r^3.(r+1).(2r+1)}$.

Let $r=1$, and we have $\frac{a}{1.2.3.4}-\frac{a+b}{2.3.4.5}$

$+\frac{a+2b}{3.4.5.6}-$ &c. $=\frac{4a-10b}{3}\times s+\frac{83b-32a}{36}$.

If $a=1$, $b=0$, $\frac{1}{1.2.3.4}-\frac{1}{2.3.4.5}+$

$\frac{1}{3.4.5.6}-$ &c. $=\frac{4}{3}s-\frac{8}{9}$.

If $a=3$, $b=1$, $\frac{1}{1.2.4}-\frac{1}{2.3.5}+\frac{1}{3.4.6}-$ &c.

$=\frac{2}{3}s-\frac{13}{36}$.

Cor. 2. If $a:b$ as $3r+2:2r$, the sum of the series can be accurately found; take $\therefore a=3r+2$, and $b=2r$, and we shall have $-\frac{3r+2}{1.r+1.2r+1.3r+1}$

$-\frac{5r+2}{r+1.2r+1.3r+1.4r+1}+$ &c. $=$

$\frac{1}{(r+1).(2r+1)}$

If $r=1$, $\frac{5}{1.2.3.4}-\frac{7}{2.3.4.5}+\frac{9}{3.4.5.6}-$

&c. $=\frac{1}{60}$;

If $r=2$, $\frac{2}{1.3.5.7}-\frac{3}{3.5.7.9}+\frac{4}{5.7.9.11}-$

&c. $=\frac{1}{15}$;

If $r=3$, $\frac{11}{1.4.7.10}-\frac{17}{4.7.10.13}+\frac{23}{7.10.13.16}$

$-$ &c. $=\frac{1}{28}$;

PROP. 5.—To find the sum of the infinite series $\frac{m}{1.r+1.2r+1.3r+1.4r+1}+$

$\frac{m+n}{2r+1.3r+1.4r+1.5r+1.6r+1}+$

$\frac{m+2n}{4r+1.5r+1.6r+1.7r+1.8r+1}+$ &c.

This series also in like manner is found equal to

$\frac{2rm-(2r+1)n}{6r^3}\times s+\frac{(4r+1)n-2rm}{12r^3}-\frac{6rm+9n}{72\cdot r^4(r+1)}-\frac{2rm+n}{24r^5\cdot(r+1)\cdot(2r+1)}$.

Let $r=1$, and we have $\frac{m}{1\cdot2\cdot3\cdot4\cdot5}+\frac{m+n}{3\cdot4\cdot5\cdot6\cdot7}+\frac{m+2n}{5\cdot6\cdot7\cdot8\cdot9}+$ &c. $=\frac{2m-3n}{6}\times s+\frac{25n-16m}{72}$.

If $m=1$, $n=0$, $\frac{1}{1\cdot2\cdot3\cdot4\cdot5}+\frac{1}{3\cdot4\cdot5\cdot6\cdot7}+\frac{1}{5\cdot6\cdot7\cdot8\cdot9}+$ &c. $=\frac{1}{3}s-\frac{2}{9}$;

If $m=1$, $n=1$, $\frac{1}{1\cdot2\cdot3\cdot4\cdot5}+\frac{2}{3\cdot4\cdot5\cdot6\cdot7}+\frac{3}{5\cdot6\cdot7\cdot8\cdot9}+$ &c. $=\frac{1}{8}-\frac{1}{6}s$;

If $m=4$, $n=2$, $\frac{1}{1\cdot2\cdot3\cdot5}+\frac{1}{3\cdot4\cdot5\cdot7}+\frac{1}{5\cdot6\cdot7\cdot9}+$ &c. $=\frac{1}{3}s-\frac{7}{36}$.

If $m=25$, $n=16$, $\frac{25}{1\cdot2\cdot3\cdot4\cdot5}+\frac{41}{3\cdot4\cdot5\cdot6\cdot7}+\frac{57}{5\cdot6\cdot7\cdot8\cdot9}+$ &c. $=\frac{1}{3}s$.

Cor. If $n:m$ as $2r:2r+1$, the sum of the series can be accurately found; assume therefore $n=2r$, $m=2r+1$, and we have

$\frac{1}{1\cdot r+1\cdot3r+1\cdot4r+1}+\frac{1}{2r+1\cdot3r+1\cdot5r+1\cdot6r+1}+$ &c. $=\frac{1}{6\cdot r\cdot(r+1)\cdot(2r+1)}$

If $r=1$, $\frac{1}{1\cdot2\cdot4\cdot5}+\frac{1}{3\cdot4\cdot6\cdot7}+\frac{1}{5\cdot6\cdot8\cdot9}$ &c. $=\frac{1}{36}$;

If $r=3$, $\frac{1}{1\cdot4\cdot10\cdot13}+\frac{1}{7\cdot10\cdot16\cdot19}+\frac{1}{13\cdot16\cdot22\cdot25}+$ &c. $=\frac{1}{504}$.

Mr. V. concludes this part with pointing out a remarkable property of those series whose sum can be accurately found: viz. that when the number of factors in the denominator is even, the numerator is always equal to the sum of the two middle factors; and when the number of factors is odd, the numerator is equal to the middle factor, and consequently will take it out of the denominator, and leave a series whose numerators are unity, and whose denominators want the middle factor.

Part. II. Prop.—To find the sum of the infinite series $\frac{p}{n(n+m)\ldots\ldots n+rm}+\frac{q}{n+m\ldots\ldots n+(r+1)m}+\frac{s}{n+2m\ldots\ldots n+(r+2)m}$ + &c. when the last differences of the numerators become equal to nothing.

Assume $a+nb+n(n+m)\cdot c+n(n+m)\cdot(n+2m)\cdot d+$ &c. to any number (r') of terms; then, if for n we write $n+m$, $n+2m$, $n+3m$, &c. successively, there will result a series of quantities whose r'th difference is $=0$; substitute therefore this series of quantities for p, q, s, &c. respectively, and the given series becomes of a form which manifestly resolves itself into several other series, the number of which is r'; and the sum of each of these being taken by a well known rule, the sum of the given series becomes

$\frac{a}{n(n+m)\ldots\ldots(n+(r-1)m)\cdot m\cdot r}+\frac{b}{n+m\ldots\ldots(n+(r-1)m)\cdot m\cdot(r-1)}+\frac{c}{n+2m\ldots\ldots(n+(r-1)m)\cdot m(r-2)}+$ &c.

where the law of continuation is manifest.

Exam. To find the sum of the infinite series $\frac{3}{1\cdot2\cdot3\cdot4}+\frac{6}{2\cdot3\cdot4\cdot5}+\frac{10}{3\cdot4\cdot5\cdot6}+\frac{15}{4\cdot5\cdot6\cdot7}$ + &c.

Here $n=1$, $m=1$, $r=3$, and the 3d differences become $=0$; therefore $a+b+2c=3$, $a+2b+6c=6$, $a+3b+12c=10$, consequently $a=1$, $b=1$, $c=\frac{1}{2}$, and therefore the sum sought will be $\frac{1}{1\cdot2\cdot3\cdot3}+\frac{1}{2\cdot3\cdot2}+\frac{1}{2\cdot3}=\frac{11}{36}$.

This proposition may also be applied to find the sum of all those series whose numerators being unity, the denominators shall be deficient by any number of corresponding terms, however taken: for as the product of all such factors must form a progression, whose differences will become equal to nothing, if such products be assumed for the numerators of the given series having its factors completed, another series will be formed equal to the given series, whose sum can be found by this proposition.

Exam. To find the sum of the infinite series $\frac{1}{1\cdot2\cdot4\cdot6}+\frac{1}{2\cdot3\cdot5\cdot7}+\frac{1}{3\cdot4\cdot6\cdot8}+$ &c.

By completing the factors in the denominators, and multiplying the numerators by the same quantities, the given series becomes $\frac{15}{1\cdot2\cdot3\cdot4\cdot5\cdot6}+\frac{24}{2\cdot3\cdot4\cdot5\cdot6\cdot7}+\frac{35}{3\cdot4\cdot5\cdot6\cdot7\cdot8}+$ &c. in which case $n=1$, $m=1$, $r=5$, and the 3d differences become $=0$; therefore $a+b+2c=15$, $a+2b+6c=24$, $a+3b+12c=35$, consequently $a=8$, $b=5$, $c=1$, and therefore the sum of the series required is $\frac{8}{1\cdot2\cdot3\cdot4\cdot5\cdot5}+\frac{5}{2\cdot3\cdot4\cdot5\cdot4}+\frac{1}{3\cdot4\cdot5\cdot3}=\frac{211}{7200}$.

By this proposition we may also investigate the sum of the series when there are any number of deficient terms in the denominators, and where the last differences of the numerators become equal to nothing; for if the factors in the denominators be completed, and the numerators be multiplied by the same quantities, their differences will still become equal to nothing.

Exam. To find the sum of the infinite series $\frac{1}{1.3.4.6} + \frac{3}{2.4.5.7} + \frac{6}{3.5.6.8} + \frac{10}{4.6.7.9} + \frac{15}{5.7.8.10}$ + &c.

This series, by completing the factors in the denominators and multiplying the numerators by the same quantities, becomes $\frac{10}{1.2.3.4.5.6} + \frac{54}{2.3.4.5.6.7} + \frac{168}{3.4.5.6.7.8}$ + &c. in which case $n=1$, $m=1$, $r=5$, and as the 5th differences are $=0$,

Therefore $a+b+2c+6d+24e=10$, $a+2b+6c+24d+120e=54$, $a+3b+12c+60d+360e=168$, $a+4b+20c+120d+840e=400$, $a+5b+30c+210d+1680e=810$; whence $a=0$, $b=0$, $c=-1$, $d=0$, $e=\frac{1}{2}$; consequently the sum of the given series is $= -\frac{1}{3.4.5.3} + \frac{1}{5.2} = \frac{17}{180}$.

By a method similar to that made use of in this proposition may any number of factors be taken from the denominators of those series delivered in part the 1st, and also from a great variety of others; but as the examples here given must be sufficient to point out the method of proceeding in all other cases, we may proceed to the 3d part.

PART 3.—The sum of every converging infinite series, whose terms ultimately become equal to nothing, may always be exhibited by the sum of another series formed by collecting two or more terms of the former series into one. This is not true however where the terms of the infinite series continually diverge, or converge to any assignable quantity, and are affected with the signs +, −, alternately: for instance, the series $\frac{1}{2}-\frac{2}{3}+\frac{3}{4}-\frac{4}{5}+$ &c. if we collect two terms into one, beginning at the 1st term, will become $-\frac{1}{2.3} - \frac{1}{4.5} - \frac{1}{6.7}$ + &c. If we begin at the 2d term, it becomes $\frac{1}{1.2} + \frac{1}{3.4} + \frac{1}{5.6}$ + &c.; neither of which gives the sum of the assumed series; but in this, and every other case of the like nature, a correction will be necessary; to determine the value of which, and whence the necessity of it arises, is the subject of this 3d part.

LEMMA.—If r be any quantity whatever, then will $\frac{1}{2r} = \frac{1}{r} - \frac{1}{r} + \frac{1}{r} - \frac{1}{r}$ + &c. ad infinitum.

For $\frac{1}{2r} = \frac{1}{r+r}$ = (by common division) $\frac{1}{r} - \frac{1}{r} + \frac{1}{r} - \frac{1}{r}$ + &c ad infinitum.

Cor. 1. Hence $-\frac{1}{2r} = -\frac{1}{r} + \frac{1}{r} - \frac{1}{r} + \frac{1}{r} -$ &c. ad infinitum.

Cor. 2. Hence also $\frac{z}{2v} = \frac{z}{v} - \frac{z}{v} + \frac{z}{v} - \frac{z}{v} +$ &c. ad infinitum.

and $-\frac{z}{2v} = -\frac{z}{v} + \frac{z}{v} - \frac{z}{v} + \frac{z}{v} -$ &c. ad infinitum.

PROP. 1.—If $\frac{n}{rn+m}$ be the general term of a series formed by writing for n any series of numbers in arithmetic progression, and whose signs are alternately + and −; then if a series be formed by collecting two terms into one, beginning at the first term, the sum of the series thence arising will be less than the sum of the given series by $\frac{1}{2r}$. If a series be formed by beginning at the second term, the sum of this will be greater than the sum of the given series by $\frac{1}{2r}$.

For let $\frac{n}{rn+m} - \frac{n+a}{(n+a)r+m}$ be any two successive terms of the series, which, if we begin to collect at the 1st term, that term being +, will be two terms to be collected into one, and which will therefore give $\frac{-am}{(rn+m)\times[(n+a)r+m]}$ for a general term of the resulting series. Let us now make n infinite, and then the denominator of this term becomes infinite, and the numerator finite; therefore the terms of this latter series at an infinite distance becoming infinitely small, the series will there terminate. Now, by making n infinite in the given series, the two successive general terms at an infinite distance become $\frac{1}{r} - \frac{1}{r}$; consequently this series is still continued after the other terminates; and the terms of such a continuation will be (as they begin with $\frac{n}{rn+m} - \frac{n+a}{(n+a)r+m}$ by making n infinite) $\frac{1}{r} - \frac{1}{r} + \frac{1}{r} - \frac{1}{r}$ + &c. which will also be continued ad infin. and whose sum by the lemma is $\frac{1}{2r}$; consequently the given series exceeds that which is formed by collecting two terms into one, beginning at the first, by $\frac{1}{2r}$; hence the sum of the latter series + $\frac{1}{2r}$ will be equal to the sum of the former. If we begin to collect at the 2d term, then will $-\frac{n}{rn+m} + \frac{n+a}{(n+a)r+m}$ be the two successive general terms of the given series to be collected into one; consequently the continuation of the given series, when n becomes infinite, will be $-\frac{1}{r} + \frac{1}{r} - \frac{1}{r} + \frac{1}{r} -$ &c. ad infinitum, whose sum by cor. 1. to the lem. is $-\frac{1}{2r}$; in this case, therefore, the sum of the given series is less than the sum of the series

formed by collecting two terms into one, beginning at the 2d term, by $\frac{1}{2r}$; hence the sum of the latter series $-\frac{1}{2r}$ will be equal to the sum of the former.

Exam. Let the given series be $\frac{1}{2}-\frac{2}{3}+\frac{3}{4}-\frac{4}{5}+$ &c.

Here $r=1, n=1, 2, 3, 4$, &c. and $m=1$. Now, if we begin to collect at the 1st term, the series resolves itself into $-\frac{1}{2\cdot3}-\frac{1}{4\cdot5}-\frac{1}{6\cdot7}-$ &c. and the correction, to be added, being $\frac{1}{2}$, we have $-\frac{1}{2\cdot3}-\frac{1}{4\cdot5}-\frac{1}{6\cdot7}-$ &c $+\frac{1}{2}$ for the sum of the given series. Now $-\frac{1}{2\cdot3}-\frac{1}{4\cdot5}-\frac{1}{6\cdot7}-$ &c. is well known to be equal to $-1+$ hyp. log. of 2; consequently the sum of the given series is $=-\frac{1}{2}+$ hyp. log. of 2.

If we begin to collect at the 2d term, the series becomes $\frac{1}{1\cdot2}+\frac{1}{3\cdot4}+\frac{1}{5\cdot6}+$ &c. and the correction, to be subtracted, being $\frac{1}{2}$ we have $\frac{1}{1\cdot2}+\frac{1}{3\cdot4}+\frac{1}{5\cdot6}+$ &c. $-\frac{1}{2}$ for the sum of the given series; but $\frac{1}{1\cdot2}+\frac{1}{3\cdot4}+\frac{1}{5\cdot6}+$ &c. is equal to the hyp. log. of 2; therefore the sum of the given series is $=-\frac{1}{2}+$ hyp. log. of 2, the same as before.

PROP. 2.—If $\frac{x+nz}{w+nv}$ be the general term of a series formed by writing for n any series of numbers in arithmetic progression, and whose terms are alternately + and −; then if a series be formed by collecting two terms into one, beginning at the first term, the sum of the series thence arising will be less than the sum of the given series by $\frac{z}{2v}$.

If a series be formed by beginning at the second term, the sum of it will be greater than the sum of the given series by $\frac{z}{2v}$.

This is proved in a manner similar to the former.

Exam. Let the given series be $\frac{7}{3}-\frac{11}{5}+\frac{15}{7}-\frac{19}{9}+$ &c.

Here $x=3, z=2, w=1, v=1, n=2, 4, 6, 8$, &c. Now, if we begin to collect at the first term, the series becomes $\frac{2}{3\cdot5}+\frac{2}{7\cdot9}+\frac{2}{11\cdot13}+$ &c. and the correction, to be added, being 1, we have $\frac{2}{3\cdot5}+\frac{2}{7\cdot9}+\frac{2}{11\cdot13}+$ &c. $+1$ for the sum of the given series; but if A = a circular arc of 45° whose radius is unity, it is well known that $\frac{2}{3\cdot5}+\frac{2}{7\cdot9}+\frac{2}{11\cdot13}+$ &c. $=1-$A; therefore the sum of the given series is $2-$A.

Besides the series contained in the foregoing propositions, a great variety of other series might be produced where a correction is necessary, after collecting two terms into one, in order to exhibit the true value of the given series. As the proper correction however may always be found from the principles delivered in the above propositions, that is, by considering what the terms of the given series become at an infinite distance, Mr. V. only adds one or two instances more, and concludes what he then intended to offer on this subject.

Exam. 1. Required to find the sum of the infinite series $\frac{3\cdot4}{1\cdot2}-\frac{4\cdot5}{2\cdot3}+\frac{5\cdot6}{3\cdot4}-\frac{6\cdot7}{4\cdot5}+$ &c.

This, by resolving two terms into one, becomes $\frac{16}{1\cdot2\ 3}+\frac{24}{3\cdot4\cdot5}+\frac{32}{5\cdot6\cdot7}-$ &c.; and as the terms of the given series continually approach to unity, the correction, to be added, is $\frac{1}{2}$, consequently $\frac{16}{1\cdot2\cdot3}+\frac{24}{3\cdot4\cdot5}+\frac{32}{5\cdot6\cdot7}-$ &c. $+\frac{1}{2}$ is equal to the sum of the given series; but by prop. 1, part 1, the sum of the series $\frac{16}{1\cdot2\cdot3}+\frac{24}{3\cdot4\cdot5}+\frac{32}{5\cdot6\cdot7}+$ &c. is equal to $8s-2$ (s being the hyp. log. 2) consequently the sum of the given series is $8s-1\frac{1}{2}$.

Exam. 2. Required to find the sum of the infinite series $\frac{1\cdot2}{1\cdot3}-\frac{2\cdot3}{3\cdot5}+\frac{3\cdot4}{5\cdot7}-\frac{4\cdot5}{7\cdot9}+$ &c.

This series, by resolving two terms into one, becomes $\frac{4}{1\cdot3\cdot5}+\frac{8}{5\cdot7\cdot9}+\frac{12}{9\cdot11\cdot13}+$ &c. and as the terms of the given series continually approach to $\frac{1}{4}$, the correction, to be added, will be $\frac{1}{1}$, therefore $\frac{4}{1\cdot3\cdot5}+\frac{8}{5\cdot7\cdot9}+\frac{12}{9\cdot11\cdot13}+$ &c. $+\frac{1}{8}$ is $=$ to the sum of the given series; but by prop. 1, part 1, the sum of $\frac{4}{1\cdot3\cdot5}+\frac{8}{5\cdot7\cdot9}+\frac{12}{9\cdot11\cdot13}+$ &c. is equal to $\frac{1}{4}s+\frac{1}{8}$ (s being a circular arc of 45°, whose radius is unity) hence the sum of the given series is $\frac{1}{4}s+\frac{1}{4}$.

This method is not only applicable to those cases, where the given series resolves itself into another, whose sum is either accurately known or can be expressed by circular arcs and logarithms,

but also to those cases where we want to approximate to the value of the given series, as it must, in general, be necessary first to render the terms of the series converging, by collecting two into one, before the operation of approximation begins, and consequently a correction of this latter is necessary in order to exhibit the value of the given series.

SERINGAPATAM, or PATANA, a city of Hindustan, capital of the S. district of Mysore, and lately of the whole country. It is situate in an island, three miles long and one broad, formed by the Cavery, which is here a large and rapid river, with a wide and rocky channel. The streets are narrow and confused, and the generality of the houses mean. The palace is very large, and surrounded by a massy wall of stone and mud. Without the walls of the city are two gardens and palaces; and near to one of them stands the mausoleum of Hyder, where his son also reposes in state. In the space between the city and the two gardens is the suburb called Shahar Ganjam, which is rapidly increasing on a regular plan. The city is strongly fortified; notwithstanding which, lord Cornwallis, in 1792, here compelled Tippoo to sign a treaty by which he ceded half of his dominions, and agreed to pay a vast sum of money to the English and their allies: and a new war taking place in 1799, the British troops carried the fort by an assault, in which Tippoo was killed. The city and the island have since been retained by the English, toward the support of the late sultan's family. Seringapatam is 10 miles N. of Mysore, and 290 W. by S. of Madras. Lon. 76. 50 E. Lat. 12. 24 N.

SERIOLA, in botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle chaffy; calyx simple; down nearly simple. Four species; natives of Barbary, Italy, Crete, Sicily.

SE'RIOUS. *a.* (*serius*, Latin.) 1. Grave; solemn; not volatile; not light of behaviour (*Young*). 2. Important; weighty; not trifling (*Shakspeare*).

SE'RIOUSLY. *ad.* (from *serious*.) Gravely; solemnly; in earnest; without levity (*South*).

SE'RIOUSNESS. *s.* (from *serious*.) Gravity; solemnity; earnest attention (*Atterbury*).

SERIPHUS, an island in the Ægean sea, about 36 miles in circumference, according to Pliny only 12, very barren and uncultivated. The Romans generally sent their criminals there in banishment.

SERISSA, in botany, a genus of the class pentandria, order monogynia. Corol funnel-form, with the throat fringed; segments of the border about three-lobed; berry inferior, two-seeded. One species, a shrub of India, Japan, and China, with opposite branches, opposite, acute, very entire leaves, and sessile flowers.

SERMOCINA'TION. *s.* (*sermocinatio*, Lat.) The act or practice of making speeches.

SERMOCINA'TOR. *s.* (*sermocinor*, Lat.) A preacher; a speechmaker (*Howel*).

SE'RMON. *s.* (*sermon*, French; *sermo*, Lat.) A discourse of instruction pronounced by a divine for the edification of the people (*Hooker*).

To SE'RMON. *v. a.* (*sermoner*, French.) 1. To discourse as in a sermon (*Spenser*). 2. To tutor; to teach dogmatically; to lesson (*Shakspeare*).

SERMOUNTAIN, in botany. See SESELI.

SERO'SITY. *s.* (*serosité*, French.) Thin or watery part of the blood (*Arbuthnot*).

SE'ROUS. *a.* (*serosus*, Latin.) 1. Thin; watery. 2. Adapted to the serum (*Arbuthnot*).

SEROUS APOPLEXY. See APOPLEXIA.

SERPA, a town of Portugal, in Alentejo, with a castle, seated on a rugged eminence, near the Guadiana, 38 miles S. by E. of Evora.

SERPENS, in astronomy, a constellation in the northern hemisphere, called more particularly serpens ophiuchi. The stars in the constellation serpens, in Ptolemy's catalogue, are 18; in Tycho's, 13; in Hevelius's, 22; and in the Britannic catalogue, 64.

SERPENT, in zoology. See SERPENTES.

SERPENT, in music, a bass wind instrument, formerly serving as a bass to the cornet. The serpent has its name from its curvilinear form, and consists of several folds or wreaths which are usually covered with leather. It has three distinct parts; a mouthpiece, neck, and tail: and six circular apertures for the modulation of its notes. The scale of this instrument, which includes every semitone in its compass, begins from C, two octaves below the C cliff note, and in general extends no higher than G, the twelfth above. But in skilful hands it is capable of rising to B flat above the bass cliff note: and some solo performers can carry it still higher.

SERPENT-STONE, a species of petrified nautilus; snake-stone; cornu ammonis. See the article HELMINTHOLITHUS.

SERPENTARIA GALLORUM. The arum dracunculus. See ORACUNCULUS.

SERPENTARIA HISPANICA. The viper's grass. See SCORZONERA.

SERPENTARIA VIRGINIANA, so called from the resemblance of its roots to the tail of the rattlesnake. Colubrina virgineana. Viperina virgineana. Virginia snake-root. The plant which affords this root is the Aristolochia serpentaria; foliis cordato oblongis planis, caulibus infirmis flexuosis teretibus, floribus solitariis. Caulis geniculata valde nodosa. Flores ad radicem of Linnéus. C. O. Gynandria, hexandria. Snake-root has an aromatic smell, approaching to that of valerian, but more agreeable; and a warm, bitterish, pungent taste. It was first recommended as a medicine of extraordinary power in counteracting the poisonous effects of the bites of serpents: this, however, is now wholly disregarded; but as it possesses tonic and antiseptic virtues, and is generally admitted to be a powerful stimulant and diaphoretic, it is employed, in the present day, in some fevers where these effects are required. A tinctura serpentariæ is directed both by the London and Edinburgh pharmacopœias.

SERPENTARIUS, in astronomy, a con-

stellation of the northern hemisphere, called also Ophiuchus, and anciently Æsculapius. The stars in the constellation Serpentarius, in Ptolemy's catalogue, are 29; in Tycho's 15; in Hevelius's 40; in the Britannic catalogue they are 74.

SERPENTES, serpents, in zoology, the second order in the Linnean class amphibia, thus ordinally characterised; footless; eggs connected in a chain, and penis double, muricate. They are cast upon the earth naked, without limbs, exposed to every injury, but frequently armed with a poison the most deadly and horrible: this is contained in tubular fangs, resembling teeth, placed without the upper jaw, protruded or retracted at pleasure, and surrounded with a glandular vesicle by which this fatal fluid is secreted. But lest this tribe should too much encroach upon the limits of other animals, the benevolent Author of nature has armed about a fifth part only in this dreadful manner, and has ordained that all should cast their skins, in order to inspire a necessary suspicion of the whole. The jaws are dilatable and not articulate, and the œsophagus so lax that they can swallow, without mastication, an animal twice or thrice as large as the neck: the colour is variable, and changes according to season, age, or mode of living, and frequently vanishes or turns to another in the dead body; tongue filiform, bifid; skin reticulate. See Zoology.

SE'RPENTINE. *a.* (*serpentinus*, Latin.) 1. Resembling a serpent (*Sidney*). 2. Winding like a serpent; anfractuous (*Sandys*).

Serpentine, in mineralogy. See Serpentinus.

SERPENTINUS, in mineralogy, a genus of the class earths, order talcose. Consisting of carbonat of magnesia, oxyd of iron and silica, with frequently a mixture of alumina, rarely of calcareous earth; dry and harsh to the touch, receiving a polish; hardening in the fire; neither effervescing with nitric acid nor absorbing oil. Four species.

1. S. nephriticus. Nephrit: Jade. Green, polishable talc. Leek-green, semipellucid, a little greasy to the touch. Found in Egypt, America, Sweden, Saxony, Bohemia, and the Siberian and Hungarian mountains, sometimes adhering to rocks, and sometimes in detached, rounded pieces; the leek-green having often a blueish cast; very hard, and does not melt in the strongest fire. The inhabitants of New Zealand use it for hatchets and other cutting instruments.

2. S. genuinus. True serpentine. Opake, without lustre, of splintery fracture, becoming whiter in the fire. Found in most European mountains, generally in large amorphus masses: colour blackish, leek, olive, or canary green, yellow, red, grey, brown, white or blue: the same specimen generally exhibiting a mixture of colours like the skin of a serpent: when breathed upon, frequently emits an earthy smell: contains magnesia 34,5. Silica 28,0. Alumina 23,0. Oxyd of iron 4,5. Lime 0,5. Water 10,5. *Chevenix.*

3. S. fissilis. Chlorit schistus, Smeisser. Green, of a slaty texture. Found in Norway, Corsica and the Tyrol, clothing the crystals of magnetic iron-stone, and leaves a mountain-green trace: contains

Oxyd of iron	43 .3
Silica	41.15
Alumina	6.13
Magnesia	39.47
Lime	1.50
Air and water	1.50
	132,78

4. S. crystallinus. Green, resembling acicular crystals. Found in Saxony and Sweden, on the surface of rock crystal.

SERPENTUM LIGNUM. The nature of this root does not appear to be yet ascertained. It is the produce of the ophioxylum serpentium of Linnéus, by whom it is said to be very bitter. In the cure of the bite of venomous serpents and malignant diseases it is said to be efficacious.

Serpentum radix. See Mangos radix.

SERPET. *s.* A basket (*Ainsworth*).

SERPICULA, in botany, a genus of the class monoecia, order tetrandria. Male: calyx four-toothed; corol four-petalled. Fem.: calyx four-parted; corrolless; nut downy, with cartilaginous swellings. Two species; one an East India plant with leaves prickly, serrate, in whorls; the other a Cape plant with alternate, linear leaves, and creeping stem.

SERPI'GINOUS. *a.* (from *serpigo*, Latin.) Diseased with a serpigo (*Wiseman*).

SERPIGO. (from *serpo*, to creep; because it creeps on the surface of the skin by degrees.) See Herpes.

SERPULA, in zoology, a genus of the class vermes, order testacea. Animal a terebella; shell univalve, tubular; generally adhering to other substances; often separated internally by divisions at uncertain distances. Forty-eight species, scattered through the seas of the globe; fifteen common to those of our own country. S. penis is usually denominated watering-pot. The shell is roundish, straight, taper, with a dilated, radiate, larger extremity, the disk covered with cylindrical pores. It inhabits the Indian ocean, and is from three to five inches long. See Nat. Hist. Pl. CLXXV.

SERPYLLUM. (ερπυλλον; from ερπω, to creep, or *à serpendo*, by reason of its creeping nature) Serpillum. Wild or mother of thyme. Thymus serpillum of Linnéus. Thymus erectus, foliis revolutis ovatis, floribus verticillato-spicatis. C. O. Didynamia, gymnospermia. This plant has the same sensible qualities as those of the garden thyme (see Thymus), but has a milder and rather more grateful flavour.

Serpyllum citratum. Lemon thyme. A variety of the thymus serpillum of Linnéus. It is very pungent; and has a particularly grateful odour, approaching to that of lemons.

To SERR. *v. a.* (*serrer*, Fr.) To drive hard together; to crowd into a little place: not used (*Bacon*).

SERRANUS, a sirname given to Cincinnatus, because he was found sowing his fields when told that he had been elected dictator.

SERRANUS, OR DE SERRES (John), a protestant who escaped with difficulty the St. Bartholomew massacre, and fled to Lausanne. He was afterwards minister at Nismes, and enjoyed the favour of Henry IV. He published in 1597 a book called De fide Catholicâ, in which he attempted to reconcile the protestants and Roman catholics to the same tenets, which displeased both parties. It is supposed that he was poisoned by the Calvinists of Geneva, as he died there suddenly 1598, aged about 50. He wrote a treatise on the immortality of the soul, 8vo.—inventory of the history of France, 2. vols. folio—memoirs of the third civil war of France, 3 vols. 8vo. &c.

SE'RRATE. SE'RRATED. *a.* (*serratus*, Latin.) Formed with jags or indentures like the edge of a saw (*Derham*).

SERRATE, in botany, (from *serra*, a saw). Serrate, toothed like a saw, but not sawed. Quod angulis acutis imbricatis extremitatem respicientibus notatur. Having sharp imbricated notches about the edge, pointing towards the extremity. The direction of the notches is the essential character of the serrate leaf. They are not always imbricate, and that circumstance is omitted in Delin. Pl.—This term is applied to the leaf in vaccinium myrtillus, arbutus unedo and alpina, papaver orientale, and many others.

When a serrate leaf has small serratures upon the large ones, it is said to be doubly-serrate, duplicato-serratum: as in elm.

The term serrate is applied also to the calyx in hypericum, to the corol in tilia, alisma, and to the stipule. It is also employed in other branches of natural history.

A serrate-ciliate leaf is a leaf having fine hairs, like the eye-lashes, on the serratures.

A serrate-toothed leaf, a leaf having the serratures toothed.

SERRATION. *s.* (from *serra*, Lat.) Formation in the shape of a saw.

SERRATULA. Saw-wort. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle chaffy, or villous; calyx imbricate, cylindrical, unarmed; down feathery or toothed. Eighteen species, for the most part natives of warm climates; two common to our own hedges or hills. The following are cultivated.

1. S. novoboracensis. Long-leaved saw-wort; a native of North America, with perennial root, erect channelled stalks, seven or eight feet high, and purple flowers.
2. S. prælta. Tall saw-wort.
3. S. glauca. Glaucous-leaved saw-wort.
4. S. squarrosa. Rough-headed saw-wort.
5. S. scariosa. Ragged-cupped saw-wort.
6. S. spicata. Spiked saw-wort.

All these, like the first, are natives of North America, and mostly with purple flowers. They may be increased either by seeds, or by parting the roots. The old plants should not have their roots parted oftener than once in three years.

SE'RRATURE. *s.* (from *serra*, Latin.) Indenture like teeth or saws (*Woodward*).

SERRATUS. (from *serra*, a saw.) In anatomy, a generic name given to various muscles, from their resemblance to the edges of this instrument.

SERRATUS MAGNUS. This muscle is so named by Winslow and Albinus. Douglas calls it *serratus major anticus*, but improperly, as it is seated at the side, and not at the anterior part of the thorax. It is a broad fleshy muscle, of a very irregular shape, and is in part covered by the subscapularis, pectoralis, and latissimus dorsi. It arises, by fleshy digitations, from the eight superior ribs, and is inserted fleshy into the whole basis of the scapula internally, between the insertion of the rhomboides and the origin of subscapularis, being folded, as it were, about the two angles of the scapula. This muscle may easily be divided into two and even three portions. The latter division has been adopted by Winslow. The first of these portions is the thick and short part of the muscle that arises from the first and second ribs, and is inserted into the upper angle of the scapula, its fibres ascending obliquely backwards. The second portion arises from the second rib, behind the origin of the first portion, and likewise from the third and fourth ribs; this portion is thin and short, and its fibres run nearly in a horizontal direction, to be inserted into the basis of the scapula. The third and most considerable portion is that which arises from the fifth, sixth, seventh, and eighth ribs, and is inserted into the lower angle of the scapula. The serratus magnus serves to move the scapula forwards, and it is chiefly by the contraction of this muscle that the shoulder is supported, when loaded with any heavy weight. The ancients, and even many of the moderns, particularly Douglas and Cowper, supposed its chief use to be to dilate the thorax, by elevating the ribs; but it can only do this when the scapula is forcibly raised.

S. MAJOR ANTICUS. See SERRATUS MAGNUS.

S. MINOR ANTICUS. See PECTORALIS MINOR.

S. POSTICUS INFERIOR. This is a thin muscle, of considerable breadth, situated at the bottom of the back, under the middle part of the latissimus dorsi. It arises by a broad thin tendon, in common with that of the last described muscle, from the spinous processes of the two, and sometimes of the three inferior dorsal vertebræ, and from three, and sometimes four of those of the lumbar vertebræ. It then becomes fleshy, and, ascending a little obliquely outwards and forwards, divides into three, and sometimes four fleshy slips, which are inserted into the lower edges of the three or four inferior ribs, at a little distance from their cartilages. Its use seems to be to pull

the ribs downwards, backwards, and outwards.

S. SUPERIOR POSTICUS. This is a small, flat, and thin muscle, situated at the upper part of the back, immediately under the rhomboideus. It arises, by a broad thin tendon, from the lower part of the ligamentum colli, from the spinous process of the last vertebra of the neck, and the two or three uppermost of the back, and is inserted into the second, third, fourth, and sometimes fifth ribs, by as many distinct slips. Its use is to expand the thorax, by pulling the ribs upwards and outwards.

SERROPALPUS, in zoology, a genus of the class insecta, order coleoptera. Antennas setaceous; feelers four, unequal; the anterior ones longer, deeply serrate, composed of four joints, the last joint very large, truncate, compressed, patelliform; the posterior ones subclavate; thorax margined, concealing the head, with a prominent angle on each side; head deflected; feet formed for digging. Two species only—S. striatus, and S. lævigatus; the former with a brown body and striate shells; the latter with a black body and smooth shells: both inhabit Europe, and are found on old wooden buildings in an autumnal evening.

To SE'RRY. *v. a.* (*serrer*, French.) To press close; to drive hard together: not used (*Milton*).

SERTORIUS (Quintus), a Roman general, born at Nursia. His first campaign was under the great Marius, against the Teutones and Cimbri. When Marius and Cinna entered Rome and slaughtered all their enemies, Sertorius expressed his sorrow at the melancholy death of so many of his countrymen. He afterwards fled for safety into Spain, when Sylla had proscribed him, and in this province he behaved himself with so much address, that he was looked upon as the prince of the country. The Lusitanians universally revered and loved him. The success of Sertorius in Spain, and his popularity among the natives, alarmed the Romans. They sent some troops to oppose him, but with little success. Four armies were found insufficient to hurt Sertorius; and Pompey and Metellus were driven with dishonour from the field. But he at length became exposed to the dangers which usually attend greatness. Perpenna, one of his officers, jealous of his fame, conspired against him. At a banquet the conspirators began to open their intentions by speaking with freedom and licentiousness in the presence of Sertorius, whose age and character had hitherto claimed deference from others. Perpenna overturned a glass of wine as a signal to the rest of the conspirators, and immediately Antonius, one of his officers, stabbed Sertorius, and the example was followed by all the rest, 73 years before Christ. Sertorius has been commended for his love of justice and moderation.

SERTULARIA, in zoology, a genus of the class vermes, order zoophyta. Animal growing in the form of a plant: stem branched, producing polypes from cup-shaped denticles or minute shells. Seventy-seven species, scattered through the seas of the globe, and often found on fuci. They are thus divided into sections.

A. Stem horny, tubular, fixed by the base, beset with cup-shaped denticles, and furnished with vesicles or ovaries containing polypes, eggs, or the living young.

B. Stem crustaceous, inclining to stone, and composed of rows of cells, without vesicles, their place being supplied by small globules. This section constitutes the cellaria of some writers. See Nat. Hist. Pl. CLXXXV.

SERVAL, mountain cat. See FELIS.

SERVANDONI (John Nicholas), a Florentine architect and painter, born 1695. He was engaged at Paris, at the play-houses, from 1728 to 1746. He was in London 1749, and prepared that beautiful edifice for the exhibition of fireworks on Tower-hill, in honour of the treaty of Aix-la-Chapelle. He died 1766. The best known of his paintings are the descent of Æneas into hell, the triumph of conjugal love, Hero and Leander, &c.

SE'RVANT. *s.* (*servant*, French.) 1. One who attends another, and acts at his command (*Milton*). 2. One in a state of subjection (*Shakspeare*). 3. A word of civility used to superiours or equals (*Swift*).

1. The first sort of servants acknowledged by the laws of England are menial servants; so called from being *intra mœnia*, or domestics. The contract between them and their masters arises upon the hiring. If the hiring be general, without any particular time limited, the law construes it to be a hiring for a year; upon a principle of natural equity, that the servant shall serve and the master maintain him, throughout all the revolutions of the respective seasons; as well when there is work to be done, as when there is not: but the contract may be made for any larger or smaller term. All single men between 12 years old and 60, and married ones under 30 years of age, and all single women between 12 and 40, not having any visible livelihood, are compellable by two justices to go out to service in husbandry or certain specific trades, for the promotion of honest industry; and no master can put away his servant, or servant leave his master, after being so retained, either before or at the end of his term, without a quarter's warning, unless upon reasonable cause, to be allowed by a justice of the peace: but they may part by consent, or make a special bargain.

2. Another species of servants are called apprentices, (from *apprendre*, to learn); and are usually bound for a term of years, by deed indented or indentures, to serve their masters, and be maintained and instructed by them. This is usually done to persons of trade, in order to learn their art and mystery; and sometimes very large sums are given with them as a premium for such their instruction: but it may be done to husbandmen, nay, to gentlemen and others. And children of poor persons may be apprenticed out by the overseers, with consent of two justices, till 24 years of

age, to such persons as are thought fitting; who are also compellable to take them: and it is held, that gentlemen of fortune and clergymen are equally liable with others to such compulsion: for which purposes our statutes have made the indentures obligatory, even though such parish-apprentice be a minor. Apprentices to trades may be discharged on reasonable cause, either at the request of themselves or masters, at the quarter-sessions, or by one justice, with appeal to the sessions; who may, by the equity of the statute, if they think it reasonable, direct restitution of a rateable share of the money given with the apprentice: and parish-apprentices may be discharged in the same manner by two justices. But if an apprentice, with whom less than 10*l.* hath been given, runs away from his master, he is compellable to serve out his time of absence, or make satisfaction for the same, at any time within seven years after the expiration of his original contract. See APPRENTICE and APPRENTICESHIP.

3. A third species of servants are labourers, who are only hired by the day or the week, and do not live *intra mœnia*, as part of the family; concerning whom the statutes before cited have made many very good regulations; 1. Directing that all persons who have no visible effects may be compelled to work: 2. Defining how long they must continue at work in summer and in winter: 3. Punishing such as leave or desert their work: 4. Empowering the justices at sessions, or the sheriff of the county, to settle their wages: and, 5. Inflicting penalties on such as either give or exact more wages than are so settled.

4. There is yet a fourth species of servants, if they may be so called, being rather in a superior, a ministerial, capacity; such as stewards, factors, and bailiffs; whom, however, the law considers as servants *pro tempore*, with regard to such of their acts as affect their master's or employer's property.

To SE'RVANT. *v. a.* (from the noun.) To subject: not in use (*Shakspeare*).

To SERVE. *v. a.* (*servir*, French; *servio*, Latin.) 1. To work for (*Genesis*). 2. To attend at command (*Milton*). 3. To obey servilely or meanly (*Denham*). 4. To supply with food ceremoniously (*Dry.*). 5. To bring meat as a menial attendant (*Taylor*). 6. To be subservient or subordinate to (*Milton*). 7. To supply with any thing (*Ezekiel*). 8. To obey in military actions. 9. To be sufficient to (*Locke*). 10. To be of use to; to assist (*Taylor*). 11. To help by good offices (*Tate*). 12. To comply with (*Hooker*). 13. To satisfy; to content (*South*). 14. To stand instead of any thing to one (*Pope*). 15. *To* SERVE *himself of.* To make use of. A mere gallicism (*Dryden*). 16. To requite: as, *he* served *me ungratefully.* 17. (In divinity.) To worship the supreme Being (*Milton*). 18. *To* SERVE *a warrant.* To seize an offender, and carry to justice. 19. *To* SERVE *an office.* To discharge any onerous and public duty.

To SERVE. *v. n.* 1. To be a servant or slave (*Genesis*). 2. To be in subjection (*Isaiah*). 3. To attend; to wait (*Luke*). 4. To act in war (*Knolles*). 5. To produce the end desired (*Sidney*). 6. To be sufficient for a purpose (*Dryden*). 7. To suit; to be convenient (*Dryden*). 8. To conduce; to be of use (*Hebrews*). 9. To officiate or minister.

SERVETUS (Michael), a learned Spaniard, famous for his opposition to the received doctrine of the Trinity, and for the martyrdom he underwent on that account, was born in 1509, at Villa Nueva, in Arragon. His father, who was a notary, sent him to the university of Toulouse, to study the civil law; and there he began to read the scriptures for the first time, probably because the reformation made then a great noise in France. He was presently convinced that the church wanted reforming; and it may be he went so far as to fancy that the Trinity was one of the doctrines to be rejected. Be that as it will, he grew very fond of Anti-trinitarian notions; and, after he had been two or three years at Toulouse, resolved to retire into Germany, and set up for a reformer. He went to Basil, by way of Lyons and Geneva; and, having had some conferences at Basil with Oecolampadius, set out for Strasburg, being extremely desirous to discourse with Bucer and Capito, two celebrated reformers of that city. At his departure from Basil, he left a manuscript, entitled De Trinitatis Erroribus, in the hands of a bookseller, who sent it afterwards to Haguenau, whither Servetus went, and got it printed in 1531. The next year he printed likewise, at Haguenau, another book, with this title, Dialogorum de Trinitate Libri duo: in an advertisement to which he retracts what he had written in his former book against the Trinity, not as if it was false, but because it was written imperfectly, confusedly, unpolitely, and as it were by a child for the use of children.

Having published these two books, he resolved to return to France, because he was poor, and did not understand the German language. He went to Basil, and thence to Lyons, where he lived two or three years: then he went to Paris, and studied physic under Sylvius, Fernelius, and other professors: he took his degree of master of arts, and was admitted doctor of physic in the university there. Having finished his medical studies at Paris, he left that city, to go and practise in some other place: he settled two or three years in a town near Lyons, and then at Vienne in Dauphiny, for the space of ten or twelve. His books against the Trinity had raised a great tumult among the German divines, and spread his name throughout all Europe. While Servetus was at Paris, his books were dispersed in Italy, and very much approved by many who had thoughts of forsaking the church of Rome: upon which, in 1539, Melancthon wrote a letter to the senate of Venice, importing, that "a book of Servetus, who had revived the error of Paulus Samosatenus, was handed about in their country, and beseeching them to take care that the impious error of that man may

be avoided, rejected, and abhorred." Servetus was at Lyons in 1542, before he settled in Vienne; and corrected the proofs of a Latin bible that was printing there, to which he added a preface and some marginal notes, under the name of Villanovanus; for he was called, in France, Villeneuve, from Villanueva, the town where he was born.

Servetus continued to be so fond of his Antitrinitarian notions, that he resolved to publish a third work in favour of them. This came out in 1553, at Vienne, with this title, Christianismi Restitutio, &c. Servetus did not put his name to this work; but Calvin informed the Roman Catholics in France that he was the real author of it. Upon this information Servetus was imprisoned at Vienne, and would certainly have been burnt alive if he had not made his escape: however, sentence was passed on him, and his effigy was carried to the place of execution, fastened to a gibbet, and afterwards burned, with five bales of his books. Servetus, in the mean time, was retiring to Naples, where he hoped to practise physic with the same high repute as he had practised at Vienne; yet was so imprudent as to take his way through Geneva, though he knew that Calvin was his mortal enemy. Calvin being informed of his arrival, acquainted the magistrates with it; upon which he was seized and cast into prison, and a prosecution was presently commenced against him for heresy and blasphemy. Calvin pursued him with great rancour; though no doubt that reformer, conformably with the notions which then prevailed, easily persuaded himself that it was all pure zeal for the cause of God, and the good of his church. The articles of his accusation were numerous, and not confined to his book, called Christianismi Restitutio, but were sought out of all his other writings, which were ransacked for every thing that could be strained to a bad sense.

The magistrates of Geneva being sensible, in the mean time, that the trial of Servetus was a thing of the highest consequence, did not think fit to give sentence without consulting the magistrates of the Protestant cantons of Switzerland, to whom, therefore, they sent Servetus's book, printed at Vienne, and also the writings of Calvin, with Servetus's answers; and at the same time desired to have the opinion of their divines about that affair. They all gave vote against him; in consequence of which he was condemned and burnt alive, Oct. 27, 1553.

SERVIA, a province of Turkey in Europe, bounded on the N. by the rivers Danube and Save, which separate it from Hungary; on the E. by Bulgaria; on the W. by Bosnia; and on the S. by Albania and Macedonia. It is about 190 miles in length from east to west; 95 in breadth from north to south; and is divided into four sangiacates. Two of these were ceded to the Christians in 1718, who united them into one. This continued till 1739, when the Turks were victorious; and then they were abandoned to the Turks by the treaty of Belgrade. Belgrade is the capital town.

SE'RVICE. *s.* (*service*, French; *servitium*, Latin.) 1. Menial office; low business done at the command of a master (*Shakspeare*). 2. Attendance of a servant (*Shakspeare*). 3. Place; office of a servant (*Temple*). 4. Any thing done by way of duty to a superiour (*Dryden*). 5. Attendance on any superiour (*Bacon*). 6. Profession of respect uttered or sent (*Shak.*). 7. Obedience; submission (*Tillotson*). 8. Act on the performance of which possession depends (*Davies*). 9. Actual duty; office (*Rog.*). 10. Employment; business (*Swift*). 11. Military duty (*Wotton*). 12. A military achievement (*Shakspeare*). 13. Purpose; use (*Spelman*). 14. Useful office; advantage conferred (*Pope*). 15. Favour (*Shakspeare*). 16. Public office of devotion (*Hooker*). 17. Course; order of dishes (*Hakewill*).

SERVICE, in law, is a duty which a tenant, on account of his fee, owes to his lord. There are many divisions of services; as, 1. Into personal, where something is to be done by the tenant in person, as homage and fealty. 2. Real, such as wards, marriages, &c. 3. Accidental, including heriots, reliefs, and the like. 4. Entire, where, on the alienation of any part of the lands by a tenant, the services become multiplied. 5. Frank-service, which was performed by freemen, who were not obliged to perform any base service, but only to find a man and horse to attend the lord into the army or to court. 6. Knight's service, by which lands were anciently held of the king, on paying homage, service in war, &c.

As in every free and well regulated society there must be a diversity of ranks, there must be a great number of persons employed in service, both in agriculture and domestic affairs. In this country, service is a contract into which the servant voluntarily enters; and the master's authority extends no further than to the performance of that species of labour for which the agreement was made. See SERVANT.

SERVICE-TREE. See SORBUS.

SERVICE-TREE (Bird's). See SORBUS.

SERVICE-TREE (Sweet). See SORBUS.

SERVICE-TREE (Maple-leaved). See CRATÆGUS.

SERVICE-TREE (Wild). See CRATÆGUS.

SE'RVICEABLE. *a.* (*servissable*, old Fr.) 1. Active; diligent; officious (*Sidney*). 2. Useful; beneficial (*Atterbury*).

SE'RVICEABLENESS. *s.* (from *serviceable*.) 1. Officiousness; activity (*Sidney*). 2. Usefulness; beneficialness (*Norris*).

SE'RVILE. *a.* (*servilis*, Latin.) 1. Slavish; dependant; mean (*Milton*). 2. Fawning; cringing (*Sidney*).

SE'RVILELY, *ad.* (from *servile*.) Meanly; slavishly (*Swift*).

SE'RVILENESS. SERVI'LITY. *s.* (from *servile*.) 1. Slavishness; involuntary obedience (*Gov. of the Tongue*). 2. Meanness; dependance; baseness. 3. Submission from fear (*West*). 4. Slavery; the condition of a slave (*Shakspeare*).

SE'RVING-MAN. *s.* (*serve* and *man.*) A menial servant (*Shakspeare*).

SE'RVITOR. *s.* (*serviteur*, French.) 1. Servant; attendant (*Davies*). 2. One of the lowest order in the university of Oxford; a student who obtains his maintenance and learning cheaper, by reason of his waiting on another. At Cambridge, undergraduates of the same class are called Sizars.

SE'RVITUDE. *s.* (*servitus*, Latin.) 1. Slavery; state of a slave: dependance (*South*). 2. Servants collectively (*Milton*).

SERVIUS TULLIUS, the sixth king of Rome, was son of Ocrisia, a slave of Corniculum, by Tullius, a man slain in the defence of his country against the Romans. Ocrisia was given by Tarquin to Tanaquil, his wife, and she brought up her son in the king's family, and added the name of Servius to that which he had inherited from his father to denote his slavery. Young Servius was educated in the palace with great care, and he raised himself so much to consequence, that Tarquin gave him his daughter in marriage. His own private virtues recommended him to the notice of the people and of the soldiers; and by his liberality and complaisance, he was easily raised to the throne on the death of his father-in-law. Servius endeared himself as a warrior and a legislator. He defeated the Veientes and the Tuscans, and established the census, which told him that Rome contained about 84,000 inhabitants. He increased the number of the tribes, beautified the city, and enlarged its boundaries by taking within its walls the hills Quirinalis, Viminalis, and Esquilinus. He also divided the Roman people into tribes. Servius married his two daughters to the grandsons of his father-in-law; the elder to Tarquin, and the younger to Arunx. In this union he was unhappily deceived. The wife of Arunx, naturally fierce and impetuous, murdered her own husband to unite herself to Tarquin, who had likewise assassinated his wife. These bloody measures were no sooner pursued than Servius was murdered by his own son-in-law, and his daughter Tullia cruelly ordered her chariot to be driven over the mangled body of her father, B. C. 534. His death was universally lamented by his subjects.—2. Sulpitius, an orator in the age of Cicero and Hortensius. He was sent as ambassador to M. Antony, and died before his return. Cicero obtained a statue for him from the senate and the Roman people, which was raised in the Campus Martius. His works are lost.

SERUM. (from *serus*, late, because it is the remainder of the milk after its better parts have been taken from it.) The serum of the blood. The yellow and somewhat greenish fluid which separates from the blood when cold and at rest. The red or colouring matter is, by some writers, called red serum; and the other white serum. See BLOOD.

SESAMOID BONES. (*ossa sesamoidea*, from σησαμη, an Indian grain, and εἰδος, likeness.) This term is applied to the little bones, which, from their supposed general resemblance to the seeds of the sesamum, are called ossa sesamoidea. They are found at the articulations of the great toes, and sometimes at the joints of the thumbs; now and then we meet with them upon the condyles of the os femoris, at the lower extremity of the fibula, under the os cuboides of the tarsus, &c.—They do not exist in the fœtus, but as we advance in life, begin first to appear in a cartilaginous state, and, at length, in adult subjects, are completely ossified. Age and hard labour seem to add to the number and size of these bones, and being most commonly found wherever the tendons and ligaments are most exposed to pressure from the action of the muscles, they are now generally considered by anatomists as the ossified parts of tendons and ligaments. These bones are usually smooth and flat on the side of the bone on which they are placed; their upper surface is convex, and, in general, adheres to the tendon that covers it, and of which it may, in some measure, be considered as a part. Although their formation seems to be owing to accidental circumstances, yet as the two at the first joint of the great toe are much larger than the rest, and are seldom wanting in an adult, it would seem as if these bones were of some utility; perhaps by removing the tendons farther from the centre of motion, and thus increasing the power of the muscles. The ossa sesamoidea of the great toe and thumb seem likewise to be of use, by forming a groove for lodging the flexor tendons secure from compression.

SESAMOIDAL BONES. See SESAMOID BONES.

SESAMUM. Oily grain. In botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol campanulate, five-cleft, with the lowest lobe larger; rudiment of a fifth filament; stigma lanceolate; capsule four-celled. Four species; all natives of India. The following are the chief.

1. S. orientale. Leaves ovate, oblong, entire, opposite; stem erect, hairy; flowers axillary, solitary; corol white, resembling that of the digitalis.

2. S. luteum. Leaves lanceolate, alternate, on long petioles; corol bristly outward: flowers yellow, axillary, solitary.

Both are annuals; the first is cultivated in India, Africa, and of late by the negroes in America, as a pulse. The seeds yield a good oil, which will keep without growing rancid for many years, and when rendered mild by being kept about two years, and thus losing the warm taste of the seeds, used as a sallad oil. The seeds are also used by the negroes for food, parched over the fire, or made into puddings like millet or rice-seeds. Two quarts of oil have been drawn from nine pounds of the oriental sesamum grown in Carolina.

SESELI. Cicely. Meadow saxifrage. In botany, a genus of the class pentandria, order digynia. Fruit ovate, striate; umbels globular; involucres consisting of a leaf or two. Fifteen species, chiefly natives of the south of Europe; a few of the Cape.

SESELI CRETICUM. There is great confusion amongst the species of the seseli. The plant which bears this epithet in the pharmacopœias is the tordylium officinale of Linnéus. The seeds are said to be diuretic.

SESIA, in the entomology of Fabricius, a tribe of the lepidopterous genus SPHINX, which see.

SESLERIA. Moor-grass. In botany, a genus of the class triandria, order digynia. Calyx two-valved, mostly three-flowered; awned; corol two-valved; the outer valve three-toothed, inner two-toothed. Two species only.

1. S. cærulea. Blue moor-grass. Spike ovate, oblong, imbricate; involucres alternate: a native of our own heaths.

2. S. sphærocaphala. Globe-headed moor-grass. Spike globular; universal involucre three-leaved. A native of Italy and Carinthia.

SESOSTRIS, a celebrated king of Egypt, some ages before the Trojan war, who, when he succeeded on his father's throne, became ambitious of military fame, and marched at the head of a numerous army to make the conquest of the world. Libya, Æthiopia, Arabia, with all the islands of the Red Sea, were conquered, and the victorious monarch marched through Asia, and penetrated farther in the east than the conqueror of Darius. He also invaded Europe, and subdued the Thracians, and placed columns in the several provinces he had subdued; many ages after, this pompous inscription was read in many parts of Asia, "Sesostris, the king of kings, has conquered this territory by his arms." At his return home, the monarch employed his time in encouraging the fine arts and in improving the revenues of his kingdom. In his old age, Sesostris, grown infirm and blind, destroyed himself, after a reign of 44 years, according to some. The age of Sesostris is so remote from every authentic record, that many have supposed that the actions and conquests ascribed to him are totally fabulous.

SESQUI. A Latin particle signifying a whole and a half, and which, when joined with altera, terza, quarta, &c. expresses a kind of ratios; particularly the several species of triples. The ratio denoted by sesqui is the second ratio of inequality, called also superparticular ratio; and which contains the lesser once, and some certain part over, as 3 : 2, where the first term contains the second once, and a unit over, which is a quota part of 2. If the part remaining be just half the lesser term, the ratio is called sesqui altera; if it be a third part of the lesser term, as 4 : 3, the ratio is sesqui quarta, and so on to infinity; still adding to sesqui, the ordinal number of the lesser term.

SESQUI-ALTERATE, in geometry and arithmetic, is a ratio between two lines, two numbers, or the like, where one of them contains the other once, with the addition of a half. Thus 6 and 9 are in a sesqui-alterate ratio; since 9 contains 6 once, and 3, which is half of 6, over; and 20 and 30 are in the same; as 30 contains 20, and half 20 or 10.

SESQUI-DUPLICATE RATIO, is when of two terms the greater contains the less twice, and half the less remains; as 15 and 6; 50 and 20.

SESQUI-TENTIONAL PROPORTION, is when any number or quantity contains another once and one third.

SE'SQUIPEDAL. SESQUIPEDA'LIAN. *a.* (*sesquipedalis*, Latin.) Containing a foot and a half (*Arbuthnot*).

SE'SQUIPLICATE. *a.* (In mathematics.) Is the proportion one quantity or number has to another, in the ratio of one and a half to one.

SESS. *s.* (for *assess*, *cess*, or *cense*.) Rate; cess charged; tax (*Davies*).

SESSA, an Indian philosopher, said to be the inventor of the game of chess. When he presented his invention to Scheram, king of India, the monarch, pleased with it, desired him to demand whatever he pleased. Sessa asked only a grain of wheat to cover the first square of the chess board, two for the second, four for the third, and so on progressively through the 64 squares. The king regarded the request as unworthy of his merit; but the philosopher persisted in his wishes, and when the numeration began to be made, it soon appeared how difficult it would be to grant it, since all the granaries of the kingdom contained not wheat enough to satisfy the demand. The king, still more pleased with the philosopher, conferred on him the highest honours of his kingdom.

SESSA, an ancient town of Naples, in Terra di Lavoro, with a bishop's see. It was formerly very considerable, and is 30 miles N. of Naples. Lon. 14. 19 E. Lat. 41. 20 N.

SESSILE LEAF. Sessile folium. In botany. Connected immediately with the stem or branch, without the intervention of a petiole: opposed to the petioled leaf. Applied to a flower which has no peduncle: as in trillium sessile. To the crown, pappus or down, which having no stipe is placed immediately on the seed: opposed to stipitate or stiped.

SE'SSION. *s.* (*session*, French; *sessio*, Lat.) 1. The act of sitting (*Brown*). 2. A stated assembly of magistrates or senators (*Milton*). 3. The space for which an assembly sits, without intermission or recess (*Stillingfleet*).

SESSION, in law, denotes a sitting of justices in court upon their commission; as the session of oyer and terminer, &c.

SESSIONS (Quarter). The session of the peace is a court of record holden before two or more justices, whereof one is of the quorum, for the execution of the authority given them by the commission of the peace, and certain statutes and acts of parliament.

The justices shall keep their sessions in every quarter of the year at least, and for three days if need be; to wit, in the first week after the feast of St. Michael, in the first week after the Epiphany, in the first week after Easter, and in the first week after St. Thomas, and oftener if need be.

Any two justices, one whereof is of the quorum, by the words of the commission of the peace, may issue their precept to the sheriff to summon a session for the general execution of their authority; and such session, holden at any time within that quarter of a year, is a general quarter session. 4 Burn, 181. And such precept should bear teste, or be dated fifteen days before the return. Nels. Intr. 35.

The sheriff also shall cause a jury to appear at such days and places as the said justices, or such two or more of them as aforesaid, shall appoint.

There are many offences which, by particular statutes, belong properly to this jurisdiction, and ought to be prosecuted in this court: as the smaller misdemeanours against the public or commonwealth, not amounting to felony; and especially offences relating to the game, highways, alehouses, bastard children, the settlement and provision of the poor, vagrants, servants' wages, apprentices, and popish recusants. Some of these are proceeded upon by indictment; and others in a summary way, by motion and order thereupon; which order may, for the most part, unless guarded against by any particular statute, be removed into the court of King's-bench by certiorari, and be there either quashed or confirmed.

Sessions for weights and measures. In London, four justices from among the mayor, recorder, and aldermen, of which the mayor or recorder to be one, may hold a session to enquire into offences of selling by false weights and measures, contrary to the statutes; and to receive indictments, punish the offenders, &c.

SESTERCE, a silver coin in use among the Romans. See Coin.

Some authors make two kinds of sesterces: the less, called sestertius, in the masculine gender; and the great one, called sestertium, in the neuter, the latter containing a thousand of the former.

Sesterce, or sestertius, was also used by the ancients for a thing containing two wholes and a half of another, as *as* was taken for any whole or integer.

SESTOS, or Sestus, a town of Thrace on the shores of the Hellespont, exactly opposite Abydos, on the Asiatic side. It is celebrated for the bridge which Xerxes built there across the Hellespont, as also for being the seat of the amours of Hero and Leander.

SESTRI-DI-LEVANTE, an ancient town of Italy, in the territory of Genoa, 30 miles W. of Genoa. Lon. 9. 28 E. Lat. 44. 23 N.

SESAVIUM, in botany, a genus of the class icosandria, order trigynia. Calyx five-parted, coloured; petalless; capsule ovate, three-celled, opening transversely all round, many-seeded. One species, a native of the Indies, with herbaceous decumbent stems; leaves wedge shaped, opposite, obtuse, fleshy; peduncles axillary, solitary, shorter than the leaves; flowers green without, white and red within.

To SET. *v. a.* preterit *I set*; part. pass. *I am set.* (settan, Saxon; *setten*, Dutch.) 1. To place; to put in any situation or place; to put (*John*). 2. To put in any condition, state, or posture (*Hooker*). 3. To make motionless; to fix immoveably (*Garth*). 4. To fix; to state by some rule (*Addison*). 5. To regulate; to adjust (*Prior*). 6. To fit to music; to adapt with notes (*Donne*). 7. To plant, not sow (*Bacon*). 8. To intersperse or variegate with any thing (*Dryden*). 9. To reduce from a fractured or dislocated state (*Herbert*). 10. To fix the affection; to determine the thoughts (*Milton*). 11. To predetermine; to settle (*Hooker*). 12. To establish; to appoint; to fix (*Bacon*). 13. To appoint to an office; to assign to a post (*Addison*). 14. To exhibit; to display (*Bacon*). 15. To propose to choice (*Tillotson*). 16. To value; to estimate; to rate (*Locke*). 17. To stake at play (*Prior*). 18. To offer a wager at dice to another (*Shak.*). 19. To fix in metal (*Dryden*). 20. To embarrass; to distress; to perplex (*Addison*). 21. To fix in an artificial manner, so as to produce a particular effect (*Psalms*). 22. To apply to something, as a thing to be done (*Dryd.*). 23. To fix the eyes (*Jeremiah*). 24. To offer for a price (*Ecclus.*). 25. To place in order; to frame (*Knolles*). 26. To station; to place (*Dryden*). 27. To oppose (*Shakspeare*). 28. To bring to a fine edge; as, *to* set *a razor*. 29. To point out, without noise or disturbance: as, *a dog* sets *birds*. 30. *To* Set *about*. To apply to (*Locke*). 31. *To* Set *against*. To place in a state of enmity or opposition (*Duppa*). 32. *To* Set *against*, To oppose; to place in rhetorical opposition (*Burnet*). 33. *To* Set *apart*. To neglect for a season (*Knolles*). 34. *To* Set *aside*. To omit for the present (*Tillotson*). 35. *To* Set *aside*. To reject (*Woodward*). 36. *To* Set *aside*. To abrogate; to annul (*Addison*). 37. *To* Set *by*. To regard; to esteem (1 *Samuel*). 38. *To* Set *by*. To reject or omit for the present (*Bacon*). 39. *To* Set *down*. To explain or relate in writing (*Clarendon*). 40. *To* Set *down*. To register or note in any book; to put to writing (*Sh.*). 41. *To* Set *down*. To fix on a resolve (*Knolles*). 42. *To* Set *down*. To fix; to establish (*Hooker*). 43. *To* Set *forth*. To publish; to promulgate; to make appear (*Shakspeare*). 44. *To* Set *forth*. To raise; to send out on expeditions (*Knolles*). 45. *To* Set *forth*. To display; to explain; to represent (*Dryden*). 46. *To* Set *forth*. To arrange; to place in order (*Shaks.*). 47. *To* Set *forth*. To show; to exhibit (*Brown*). 48. *To* Set *forward*. To advance; to promote (*Job*). 49. *To* Set *in*. To put in a way to begin (*Collier*). 50. *To* Set *off*. To decorate; to recommend; to adorn; to embellish (*Walker*). 51. *To* Set *on* or *upon*. To animate; to instigate; to incite (*Clarendon*). 52. *To* Set *on* or *upon*, To attack; to assault (*Taylor*). 53. *To* Set *on* To employ as in a task (*Shakspeare*). 54. *To* Set *on* or *upon*. To fix the attention; to determine to any thing with settled and full resolution (*Sidney*). 55. *To* Set *out*. To assign; to allot (*Spenser*). 56. *To* Set *out*. To publish (*Swift*). 57. *To*

SET *out*. To mark by boundaries or distinctions of space (*Locke*). 58. *To* SET *out*. To adorn; to embellish (*Dryden*). 59. *To* SET *out*. To raise; to equip (*Addison*). 60. *To* SET *out*. To show; to display; to recommend (*Atterbury*). 61. *To* SET *out*. To show; to prove (*Atterbury*). 62. *To* SET *up*. To erect; to establish newly (*Atterbury*). 63. *To* SET *up*. To enable to commence a new business (*Pope*). 64. *To* SET *up*. To build; to erect (*Pope*). 65. *To* SET *up*. To raise; to exalt; to put in power (*Suckling*). 66. *To* SET *up*. To establish; to appoint; to fix (*Locke*). 67. *To* SET *up*. To place in view (*Addison*). 68. *To* SET *up*. To place in repose; to fix; to rest (*Wake*.). 69. *To* SET *up*. To raise by the voice (*Dryden*). 70. *To* SET *up*. To advance; to propose to reception (*Burnet*). 71. *To* SET *up*. To raise to a sufficient fortune; to *set up* a trader (*L'Estrange*).

To SET. *v. n.* 1. To go below the horizon, as the sun at evening (*Brown*). 2. To be fixed hard (*Bacon*). 3. To be extinguished or darkened, as the sun at night (1 *Kings*). 4. To fit music to words (*Shaksp.*). 5. To become not fluid; to concrete (*Boyle*). 6. To begin a journey (*Shakspeare*). 7. To put one's self into any state or posture of removal (*Dryden*). 8. To catch birds with a dog that *sets* them, that is, lies down and points them out (*Boyle*). 9. To plant, not sow. 10. It is commonly used in conversation for *sit* (*Shakspeare*). 11. To apply one's self (*Hammond*). 12. *To* SET *about*. To fall to; to begin (*Calamy*). 13. *To* SET *in*. To become settled in a particular state (*Addison*). 14. *To* SET *on* or *upon*. To begin a march, journey, or enterprise (*Locke*). 15. *To* SET *on*. To make an attack (*Shaks.*). 16. *To* SET *out*. To have beginning (*Brown*). 17. *To* SET *out*. To begin a journey, or course (*Hammond*). 18. *To* SET *out*. To begin the world (*Swift*). 19. *To* SET *to*. To apply himself to (*Gov. of the Tongue*). 20. *To* SET *up*. To begin a trade openly (*Swift*). 21. *To* SET *up*. To begin a scheme of life (*Arbuthnot*). 22. *To* SET *up*. To profess publicly (*Dry.*).

SET. *part. a.* (from the verb.) Regular; not lax; made in consequence of some formal rule (*Rogers*).

SET. *s.* (from the verb.) 1. A number of things suited to each other; things considered as related to each other (*Broome*). 2. Any thing not sown, but put in a state of some growth into the ground (*Mortimer*). 3. The fall of the sun, or other bodies of heaven, below the horizon (*Shakspeare*). 4. A wager at dice (*Dryden*). 5. A game (*Shakspeare*).

SETA, in natural history. A bristle. A strong, stiff, roundish hair. A sort of pubescence. Linnéus also puts it for the scape of the capsule in mosses.

SETACEOUS. Bristle-shaped. Having the thickness and length of a bristle. In botany, applied to the leaf; and to the leaflets or divisions of the calyx.

SETACEUM. (from *seta*, a bristle; because horse hairs were first used to keep open the wound). A seton. See SETON.

SETCHUEN, a province of China, bounded on the N. by Chen-si, on the E. by Houquang, on the S. by Koei-tcheou, and on the W. by Thibet. It is watered by the great river Yang-tse-kiang, and is rich, not only on account of the great quantity of silk it produces, but its mines of iron, tin, and lead, as well as its amber, sugar-canes, and lapis lazuli. It likewise abounds in musk, rhubarb, &c. Tching-tou-fou is the capital.

SETH, the third son of Adam, was born 3874 B. C. and lived 912 years.

SETHIANS, in church-history, Christian heretics; so called because they paid divine worship to Seth, whom they looked upon to be Jesus Christ the son of God, but who was made by a third divinity, and substituted in the room of the two families of Abel and Cain, which had been destroyed by the deluge. These heretics appeared in Egypt in the second century; and as they were addicted to all sorts of debauchery, they did not want followers; and continued in Egypt above 200 years.

SETIMO, a town of Piedmont, seated on the Po, eight miles N. of Turin. Lon. 7. 47 E. Lat. 45. 14 N.

SETINES. See ATHENS.

SETLEGE, a river of Hindustan Proper, the most easterly of the five eastern branches of the Indus. About midway between its source and the Indus, it receives the Beyah, and joins the Indus a great way to the S. of Moultan.

SETON. An artificial ulcer made under the skin by means of an instrument called the seton needle, which carries with it a portion of thread or silk, that is moved backwards or forwards, and thus keeps up a constant irritation.

Setons are often employed as a topical stimulus in the human subject; but still more frequently resorted to in veterinary science as a mean of discharging pus, and healing abcesses in horses without leaving any disfigurement, and, at the same time, with more ease and certainty. They are at all times, says an able writer, to be used in preference to making deep incisions into the muscular parts, for these not only disfigure horses, but are afterwards very difficult to heal up, on account of the unfavourable situation of some of those tumours, and the horizontal position of the body, which in many cases will not allow of a depending opening to carry off the matter, as in tumours on the back, withers, and the upper part of the neck, immediately behind the ears, which are very common. Nor is the horizontal position of the body the only impediment; for the natural restlessness and impatience of a horse renders it impracticable to fix proper bandages on these elevated parts, nor will the situation of them admit of proper dressings being fixed so as to remain for any length of time. Hence the openings made into such tumours are frequently left bare, and exposed to the cold air, &c.; degenerate into very foul ulcers, and produce a very great deal of fungous flesh, which requires to be repeatedly cut away with the knife, as the strongest caustics that

can be applied are not sufficient to retard its growth.

SETTEE, in sea-language, a vessel very common in the Mediterranean, with one deck and a very long and sharp prow. They carry some two masts, some three, without topmasts. They have generally two masts, equipped with triangular sails, commonly called lateen sails. The least of them are of 60 tons burden. They serve to transport cannon and provisions for ships of war and the like.

SETTE'E. *s.* A large long seat with a back to it.

SE'TTER. *s.* (from *set.*) 1. One who sets (*Addison*). 2. A dog who beats the field, and points the bird for the sportsmen. 3. A man who performs the office of a setting dog, or finds out persons to be plundered (*South*).

SETTER, in the game of hazard, the person who sets the caster; or, in other words, the player who makes stakes with the person holding the box and dice, who, if he throw in, draws the money; while, on the contrary, if he throw out, the setter is the winner.

SETTER-TO, in cocking, the person who in a cock-pit receives the cock (going to fight) from the feeder, and hands him upon the sod during the battle, according to the laws of the pit, and the conditions of the match. See COCKING, COCK-PIT, and MAIN of COCKS.

SETTERWORT. The bear's foot is sometimes so termed. See HELLEBORASTER.

SETTING, in astronomy, the withdrawing of a star or planet, or its sinking below the horizon. Astronomers and poets make three different kinds of setting of the stars, viz. the COSMICAL, ACRONYCAL, and HELIACAL. See those articles.

SETTING, in the sea-language. To set the land or the sun by the compass, is to observe how the land bears on any point of the compass, or on what point of the compass the sun is. Also, when two ships sail in sight of one another, to mark on what point the chased bears, is termed setting the chase by the compass.

SETTING (with cock-fighters), is a term used after a cock has fought so long that he is not able to stand, or gives over fighting; he is then brought to the other cock, and set beak to beak, and if he do not strike the battle is lost.

SETTING-DOG; a dog trained up to the setting of partridges, &c. This dog may be either a land-spaniel, water-spaniel, or a mongrel, or indeed the shallow-flued hound, tumbler, lurcher, or small bastard-mastiff, but none is better than the land-spaniel: he should be of a good nimble size, rather small than thick, and of a courageous mettle. See SPANIEL.

SETTLE, a town in the W. riding of Yorkshire, with a market on Tuesday. It is seated on the Ribble, over which is a bridge, 28 miles E. by N. of Lancaster, and 235 N.N. W. of London. Lon. 2. 15 W. Lat 54. 6 N.

SETTLE (Elkanah), born in 1648, and entered a commoner of Trinity-college, Oxford, which he quitted without taking a degree. He became poet to the city of London, with an annual pension, and published weekly essays in favour of the administration. Wood says he wrote with equal zeal on the side of whigs and tories, just as interest prevailed. He published no less than 17 dramatic pieces: his first was Cambyses, King of Persia; his last, the Ladies Triumph. He died in the Charter-house, 1724.

SETTLE. *s.* (re ol, Saxon.) A seat; a bench; something to sit on (*Ezekiel*).

To SETTLE. *v. a.* (from the noun.) 1. To place in any certain state after a time of fluctuation or disturbance (*Ezekiel*). 2. To fix in any way of life (*Dryden*). 3. To fix in any place (*Milton*). 4. To establish; to confirm (*Prior*). 5. To determine; to affirm; to free from ambiguity (*Addison*). 6. To fix; to make certain or unchangeable (*Dryden*). 7. To fix; not to suffer to continue doubtful in opinion, or desultory and wavering in conduct (*Swift*). 8. To make close or compact (*Mort.*). 9. To fix unalienably by legal sanctions (*Addison*). 10. To fix inseparably (*Boyle*). 11. To affect, so as that the dregs or impurities sink to the bottom (*Davies*). 12. To compose; to put into a state of calmness (*Duppa*).

To SETTLE. *v. n.* 1. To subside; to sink to the bottom and repose there (*Brown*). 2. To lose motion or fermentation; to deposit feces at the bottom (*Addison*). 3. To fix one's self; to establish a residence (*Arbuthnot*). 4. To choose a method of life; to establish a domestic state (*Prior*). 5. To become fixed so as not to change (*Bacon*). 6. To quit an irregular and desultory for a methodical life. 7. To take any lasting state (*Burnet*). 8. To rest; to repose (*Pope*). 9. To grow calm (*Shaks.*). 10. To make a jointure for a wife (*Garth*). 11. To contract (*Mortimer*).

SE'TTLEDNESS. *s.* (from *settle.*) The state of being settled; confirmed state (*King Charles*).

SE'TTLEMENT. *s.* (from *settle.*) 1. The act of settling; the state of being settled. 2. The act of giving possession by legal sanction (*Dryden*). 3. A jointure granted to a wife (*Swift*). 4. Subsidence; dregs (*Mortimer*). 5. Act of quitting a roving for a domestic and methodical life (*L'Estrange*). 6. A colony; a place where a colony is established.

SETTLEMENT (Act of), in British history, a name given to the statute 12 and 13 W. III. cap. 2. whereby the crown was limited to his present majesty's illustrious house; and some new provisions were added, at the same fortunate era, for better securing our religion, laws, and liberties; which the statute declares to be the birthright of the people of England, according to the ancient doctrine of the common law.

SE'VEN. *a.* (seopon, Saxon.) Four and three; one more than six.

SE'VENFOLD. *a.* (*seven* and *fold.*) Repeated seven times; having seven doubles (*Donne*).

SE'VENFOLD. *ad.* Seven times (*Genesis*).

SE'VENNIGHT. *s.* (*seven* and *night.*) A

A week; the time from one day of the week to the next day of the same denomination preceding or following (*Sidney*). 2. We use still the word *sevennight* or *se'nnight* in computing time: as, it happened on Monday was *sevennight*, that is, *on the Monday before last Monday*; it will be done on Monday *sevennight*, that is, *on the Monday after next Monday*.

SEVEN ISLANDS, islands to that number, in the Frozen Ocean, lying in lon. 18. 48 E. lat. 80. 31 N. Among these islands captain Phipps, with the Race-horse and Carcass, were surrounded by the ice, from the 31st of July to the 10th of August 1773, when a brisk wind at N.N.E. effected their deliverance.

SEVENOAKS, a town in Kent, with a market on Saturday. It obtained its name from seven large oaks which were near it when it was first built. Here is an hospital for the maintenance of aged people, with a freeschool, first erected by sir William Sevenoaks, lord mayor of London in 1418, who is said to have been a foundling, charitably educated by a person of this town. Queen Elizabeth having augmented the revenues of the school, it was called Queen Elizabeth's school; and the whole was rebuilt of stone in 1727. Near this town is Knole, an ancient palace of the see of Canterbury, which archbishop Cranmer exchanged with the crown for other lands, and queen Elizabeth gave to Thomas lord Buckhurst, afterward earl of Dorset, from whom it descended to the present duke of Dorset. In 1450, the rebel John Cade defeated the royal army near this town. It is six miles N.W. of Tunbridge, and 13 S.S.E. of London. Lon. 0. 18 E. Lat. 51. 19 N.

SE'VENSCORE. *a.* (*seven* and *score.*) Seven times twenty; a hundred and forty (*Bacon*).

SE'VENTEEN. *a.* (ꝛeoꝑonꝛyne, Saxon.) Seven and ten.

SE'VENTEENTH. *a.* (ꝛeoꝑonꝛeoꝺa, Sax.) The seventh after the tenth.

SE'VENTH. *a.* (ꝛeoꝑonꝺa, Saxon.) 1. The ordinal of seven; the first after the sixth (*Dryden*). 2. Containing one part in seven (*Shakspeare*).

SEVENTH. A dissonant interval called by the Greeks *heptachordon*, because it is formed of seven sounds, or six diatonic degrees. There are four kinds of sevenths. The minor seventh, composed of four tones (three majors and one minor), and two major semitones; the major seventh, composed diatonically of five tones (three majors and two minors), and a major semitone; the diminished seventh, consisting of three tones (two minors and one major), and three major semitones; and the superfluous seventh, containing five tones (three minors and two majors), a semitone major, and a semitone minor.

SE'VENTHLY. *ad.* (from *seventh.*) In the seventh place (*Bacon*).

SE'VENTIETH. *a.* (from *seventy.*) The tenth, seven times repeated; the ordinal of seventy.

SE'VENTY. *a.* (ꝛeoꝑonꝛiȝ, Saxon.) Seven times ten.

To SE'VER. *v. a.* (*sevrer*, French; *separo*, Latin.) 1. To part by violence from the rest (*Granville*). 2. To divide; to part; to force asunder (*Shakspeare*). 3. To separate; to segregate; to put in different orders or places (*Dryden*). 4. To separate by chemical operation. 5. To divide by distinctions (*Bacon*). 6. To disjoin; to disunite (*Boyle*). 7. To keep distinct; to keep apart (*Shakspeare*).

To SE'VER. *v. n.* 1. To make a separation; to make a partition (*King Charles*). 2. To suffer disjunction (*Shakspeare*).

SEVER (St.), a town of France, in the department of Landes, seated on the Adour, 20 miles E. of Dax, and 65 S. by E. of Bourdeaux. Lon. 0. 35 W. Lat. 43. 45 N.

SE'VERAL. *a.* (from *sever.*) 1. Different; distinct from one another (*Davies*). 2. Divers; many (*Addison*). 3. Particular; single (*Dryden*). 4. Distinct; appropriate (*Milton*).

SE'VERAL. *s.* (from the adjective.) 1. A state of separation, or partition (*Tusser*). 2. Each particular singly taken (*Hammond*). 3. Any enclosed or separate place (*Hooker*). 4. Enclosed ground (*Bacon*).

SE'VERALLY. *ad.* (from *several.*) Distinctly; particularly; separately (*Newton*).

SE'VERALTY. *s.* (from *several.*) State of separation from the rest (*Wotton*).

SE'VERANCE. *s.* (from *sever.*) Separation; partition (*Carew*).

SEVE'RE. *a.* (*severe*, French; *severus*, Latin.) 1. Sharp; apt to punish; censorious; apt to blame; hard; rigorous (*Taylor*). 2. Rigid; austere; morose; harsh (*Milton*). 3. Cruel; inexorable (*Wisdom*). 4. Regulated by rigid rules; strict (*Milton*). 5. Exempt from all levity of appearance; grave; sober; sedate (*Waller*). 6. Not lax; not airy; close; strictly methodical; rigidly exact (*More*). 7. Painful; afflictive (*Milton*). 8. Close; concise; not luxuriant (*Dryden*).

SEVE'RELY. *ad.* (from *severe.*) 1. Painfully; afflictively (*Swift*). 2. Ferociously; horridly (*Dryden*). 3. Strictly; rigorously (*Savage*).

SEVERINO (St.), a fortified town of Naples, in Calabria Citeriore, with an archbishop's see. It is seated on a craggy rock, on the river Neeto, eight miles from the sea, and 45 S.E. of Rossano. Lon. 17. 14 E. Lat. 39. 15 N.

SEVERINO (St.), a town of Italy, in the marquisate of Ancona, with a bishop's see. It has fine vineyards, and is seated between two hills, on the river Petenza, six miles N.W. of Tolentino. Lon. 13. 6 E. Lat. 43. 16 N.

SEVE'RITY. *s.* (*severitas*, Latin.) 1. Cruel treatment; sharpness of punishment (*Bacon*). 2. Hardness; power of distressing (*Hale*). 3. Strictness; rigid accuracy (*Dryden*). 4. Rigour; austerity; harshness; want of mildness; want of indulgence.

SEVERN, a river which rises near Plimlimmon Hill, in Montgomeryshire, and before it enters Shropshire receives about 30 streams,

and passes down to Laudring, where it receives the Morda, that flows from Oswestry. When it arrives at Monford it receives the river Mon, passing on to Shrewsbury, which it almost surrounds, then to Bridgenorth; afterwards it runs through the skirts of Staffordshire, enters Worcestershire, and passes by Worcester; then it runs to Tewkesbury, where it joins the Avon, and from thence to Gloucester, keeping a north-westerly course, till it falls into the British Channel. It begins to be navigable for boats at Welchpool, in Montgomeryshire, and takes in several other rivers in its course, besides those already mentioned, and is the second in England. By the late inland navigation, it has communication with the rivers Mersey, Dee, Ribble, Ouse, Trent, Derwent, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles in the counties of Lincoln, Nottingham, York, Lancaster, Westmoreland, Chester, Stafford, Warwick, Leicester, Oxford, Worcester, &c.

SEVERUS (Cornelius), an ancient Latin poet of the Augustan age, whose Ætna, together with a fragment, De Morte Ciceronis, were published, with notes and a prose interpretation, by Le Clerc, 12mo. Amsterdam, 1703. They were before inserted among the Catalecta Virgilii published by Scaliger, whose notes, with others, Le Clerc has received among his own.

SEVERUS (Septimus), a Roman emperor, who has been so much admired for his military talents, that some have called him the most warlike of the Roman emperors. As a monarch he was cruel; and it has been observed that he never did an act of humanity, or forgave a fault. In his diet he was temperate, and he always showed himself an open enemy to pomp and splendour. He loved the appellation of a man of letters, and he even composed a history of his own reign, which some have praised for its correctness and veracity. However cruel Severus may appear in his punishments and in his revenge, many have endeavoured to exculpate him, and observed that there was need of severity in an empire where the morals were so corrupted, and where no less than 3000 persons were accused of adultery during the space of 17 years. Of him, as of Augustus, some were fond to say, that it would have been better for the world if he had never been born, or had never died.

SEVERUS'S WALL, in British topography, the fourth and last barrier erected by the Romans against the incursions of the North Britons. See the article ANTONINUS'S WALL.

Though neither Dio nor Herodian make any mention of a wall built by Severus, in Britain, for the protection of the Roman province, yet we have abundant evidence from other writers of equal authority, that he really built such a wall. "He fortified Britain," says Spartian, "with a wall drawn across the island from sea to sea; which is the greatest glory of his reign. After the wall was finished, he retired to the next station (York), not only a conqueror, but the founder of an eternal peace." To the same purpose, Aurelius Victor and Orosius, to say nothing of Eutropius and Cassiodorus: "Having repelled the enemy in Britain, he fortified the country, which was suited to that purpose, with a wall drawn across the island from sea to sea."—"Severus drew a great ditch, and built a strong wall, fortified with several turrets, from sea to sea, to protect that part of the island which he had recovered from the yet unconquered nations." As the residence of the emperor Severus in Britain was not quite four years, it is probable that the two last of them were employed in building this wall; according to which account, it was begun A. D. 209, and finished A. D. 210.

This wall of Severus was built nearly on the same tract with Hadrian's rampart, at the distance only of a few paces north. The length of this wall, from Cousins' house near the mouth of the river Tyne on the east, to Boulness on the Solway frith on the west, hath been found, from two actual mensurations, to be a little more than 68 English miles, and a little less than 74 Roman miles. To the north of the wall was a broad and deep ditch, the original dimensions of which cannot now be ascertained, only it seems to have been larger than that of Hadrian. The wall itself, which stood on the south brink of the ditch, was built of free-stone, and where the foundation was not good it is built on piles of oak; the interstices between the two faces of this wall are filled with broad thin stones, placed not perpendicularly, but obliquely on their edges; the running mortar or cement was then poured upon them, which by its great strength and tenacity bound the whole together, and made it firm as a rock. But though these materials are sufficiently known, it is not easy to guess where they were procured, for many parts of the wall are at a great distance from any quarry of free-stone; and though stone of another kind was within reach, yet it does not appear to have been any where used. The height of this wall was 12 feet besides the parapet, and its breadth 8 feet, according to Bede, who lived only at a small distance from the east end of it, and in whose time it was almost quite entire in many places. Such was the wall erected by the command and under the direction of the emperor Severus in the north of England; and, considering the length, breadth, height, and solidity, it was certainly a work of great magnificence and prodigious labour. But the wall itself was but a part, and not the most extraordinary part, of this work.

The fortresses which were erected along the line of Severus's wall for its defence were of three different kinds, and three different degrees of strength; and were called by three different Latin words, which may be translated stations, castles, and turrets. Of each of these in their order.

The *stationes*, stations, were so called from their stability and the stated residence of garrisons. They were also called *castra*, which

hath been converted into *chestres*, a name which many of them still bear. These were by far the largest, strongest, and most magnificent of the fortresses which were built upon the wall, and were designed for the head quarters of the cohorts of troops which were placed there in garrison, and from whence detachments were sent into the adjoining castles and turrets. These stations, as appears from the vestiges of them which are still visible, were not all exactly of the same figure nor of the same dimensions; some of them being exactly squares, and others oblong, and some of them a little larger than others. These variations were no doubt occasioned by the difference of situation and other circumstances. The stations were fortified with deep ditches and strong walls, the wall itself coinciding with and forming the north wall of each station. Within the stations were lodgings for the officers and soldiers in garrison; the smallest of them being sufficient to contain a cohort, or 600 men. Without the walls of each station was a town, inhabited by labourers, artificers, and others, both Romans and Britons, who chose to dwell under the protection of these fortresses. The number of the stations upon the wall was exactly 18; and if they had been placed at equal distances, the interval between every two of them would have been four miles and a few paces: but the intervention of rivers, marshes, and mountains; the conveniency of situations for strength, prospect, and water; and many other circumstances to us unknown, determined them to place these stations at unequal distances. The situation which was always chosen by the Romans, both here and everywhere else in Britain where they could obtain it, was the gentle declivity of a hill, near a river, and facing the meridian sun. Such was the situation of the far greatest part of the stations on this wall. In general we may observe that the stations stood thickest near the two ends and in the middle, probably because the danger of invasion was greatest in these places. But the reader will form a clear idea of the number of these stations, their Latin and English names, their situation and distance from one another, by inspecting the following table. The first column contains the number of the station, reckoning from east to west; the second contains its Latin, and the third its English name; and the three last its distance from the next station to the west of it, in miles, furlongs, and chains.

N°	Latin Name.	English Name.	M.	F.	C.
1	Segedunum	Cousins'-house	3	5	1½
2	Pons Ælii	Newcastle	2	0	9
3	Condercum	Benwell hill	6	6	5
4	Vindobala	Rutchester	7	0	3½
5	Hunnum	Halton-chesters	5	1	7
6	Cilurnum	Walwick-chesters	3	1	8
7	Procolitia	Carrawbrugh	4	5	3½
8	Borcovicus	Housesteeds	1	3	8
9	Vindolana	Little-chesters	3	6	4
10	Æsica	Great-chesters	2	1	6½
11	Magna	Carrvoran	2	6	0
12	Amboglanna	Burdoswald	6	2	8
13	Petriana	Cambeck	2	6	6
14	Aballaba	Watchcross	5	1	9
15	Congavata	Stanwix	3	3	4
16	Axelodunum	Brugh	4	0	9
17	Gabrosentum	Brumbrugh	3	4	1
18	Tunnocelum	Boulness	0	0	0
		Length of the wall	68	3	3

The *castella*, or castles, were the second kind of fortifications which were built along the line of this wall for its defence. These castles were neither so large nor strong as the stations, but much more numerous, being no fewer than 81. The shape and dimensions of the castles, as appears from the foundations of many of them which are still visible, were exact squares of 66 feet every way. They were fortified on every side with thick and lofty walls, but without any ditch, except on the north side; on which the wall itself, raised much above its usual height, with the ditch attending it, formed the fortification. The castles were situated in the intervals between the stations, at the distance of about seven furlongs from each other; though particular circumstances sometimes occasioned a little variation. In these castles guards were constantly kept by a competent number of men detached from the nearest stations.

The *turres*, or turrets, were the third and last kind of fortifications on the wall. These were still much smaller than the castles, and formed only a square of about 12 feet, standing out of the wall on its south side. Being so small, they are more entirely ruined than the stations and castles, which makes it difficult to discover their exact number. They stood in the intervals between the castles; and from

the faint vestiges of a few of them it is conjectured that there were four of them between every two castles, at the distance of about 300 yards from one another. According to this conjecture, the number of the turrets amounted to 324. They were designed for watch-towers and places for sentinels, who, being within hearing of one another, could convey an alarm or piece of intelligence to all parts of the wall in a very little time.

Such were the stations, castles, and turrets, on the wall of Severus; and a very considerable body of troops was constantly quartered in them for its defence. The usual complement allowed for this service was as follows:

1. Twelve cohorts of foot, consisting of 600 men each, - - -	7,200
2. One cohort of mariners in the station at Boulness, - - -	600
3. One detachment of Moors, probably equal to a cohort, - - -	600
4. Four alæ or wings of horse, consisting, at the lowest computation, of 400 each, - - - - -	1,600
	10,000

For the conveniency of marching these troops from one part of the wall to another, with the greater ease and expedition, on any service, it was attended with two military ways, paved with square stones in the most solid and beautiful manner. One of these ways was smaller, and the other larger. The smaller military way ran close along the south side of the wall, from turret to turret, and castle to castle, for the use of the soldiers in relieving their guards and sentinels, and such services. The larger way did not keep so near the wall, nor touch at the turrets or castles, but pursued the most direct course from one station to another, and was designed for the conveniency of marching larger bodies of troops.

This wall of Severus, and its fortresses, proved an impenetrable barrier to the Roman territories for near 200 years. But about the beginning of the 5th century, the Roman empire being assaulted on all sides, and the bulk of their forces withdrawn from Britain, the Mæatæ and Caledonians, now called Scots and Picts, became more daring; and some of them breaking through the wall, and others sailing round the ends of it, they carried their ravages into the very heart of Provincial Britain. These invaders were, indeed, several times repulsed by the Roman legions sent to the relief of the Britons. The last of these legions, under the command of Gallio of Ravenna, having, with the assistance of the Britons, thoroughly repaired the breaches of Severus's wall and its fortresses, and exhorted the Britons to make a brave defence, took their final farewell of Britain. It soon appeared that the strongest walls and ramparts are no security to an undisciplined and dastardly rabble, as the unhappy Britons then were. The Scots and Picts met with little resistance in breaking through the wall, while the towns and castles were tamely abandoned to their destructive rage. In many places they levelled it with the ground, that it might prove no obstruction to their future inroads.—From this time no attempts were ever made to repair this noble work. Its beauty and grandeur procured it no respect in the dark and tasteless ages which succeeded. It became the common quarry for more than a thousand years, out of which all the towns and villages around were built; and is now so entirely ruined, that the penetrating eyes of the most poring and patient antiquarian can hardly trace its vanishing foundations.

SEVIGNE (Marie de Rabutin, Marquise de), a French lady, celebrated for her wit and her wisdom, was born in 1626; and was not above a year old when her father was killed at the descent of the English upon the isle of Rhee. In 1644 she married the marquis of Sevigné, who was killed in a duel in 1651, and had a son and daughter by him, to the care of whose education she afterwards religiously devoted herself: they became accordingly most accomplished persons, as it was reasonable to expect. This illustrious lady was acquainted with all the wits and learned of her time. She died in 1696, and left us a most valuable collection of letters; the best edition of which is that of Paris, 1754, in 8 vols. 12mo.

SEVILLE, a city of Spain, capital of Andalusia, and an archbishop's see, seated on the Guadalquiver. It was the capital of the kingdom till Philip II. established his court at Madrid, as a more central position. Seville is nearly circular; fortified by strong walls flanked with high towers, and occupies more ground than Madrid, although it now has not 80,000 inhabitants. The Phœnicians called it Hispatis, and it is the Julia of the Romans, who embellished it with many magnificent buildings. The Moors built an aqueduct, still to be seen, six miles in length. The cathedral is by some supposed to be the largest church in the world next to St. Peter's at Rome; the steeple is of curious workmanship, and extremely high, consisting of three towers, one above another, with galleries and balconies. The churches and convents are opulent and beautiful; of the latter, that of St. Francis is adorned with a handsome public square, in the midst of which is a fine fountain. The university consists of many colleges; and the professors enjoy rich pensions. The royal palace called Alcazar was partly built after the antique by the Moors, and partly in the modern taste by king Pedro; it is a mile in extent, and flanked by large square towers, built with stones, taken from the ancient temple of Hercules. Here is a foundery, and one of the largest depots for artillery in the kingdom. The principal manufactures are silk; and behind the Alcazar is a royal snuff manufacture, which is strictly examined and guarded. The exchange is a square building of the Tuscan order, each front 100 feet in length, and three stories high. The townhouse is adorned with a great number of statues, and there is a large

square before it, with a fine fountain in the middle. There are 120 hospitals richly endowed. The suburb of Triano stands on the other side of the river, over which is a long bridge of boats. In this suburb the house of the inquisition is placed; and there are public walks where most of the inhabitants go to take the air. The situation of Seville renders it one of the most commercial towns of Spain. All the trade of that kingdom with the New World centered originally in its port; but that of Cadiz having been found more commodious, the galleons have sailed from that place since 1720. Such vast employment did the American trade give at one period, that in Seville alone there were no fewer than 16,000 looms in silk or woollen work; but, before the end of the reign of Philip III, they were reduced to 400. The country around is extremely fertile in corn, wine, &c. and there is abundance of oil; for to the W. of the river is a grove of olive-trees, 30 miles in length. Seville is 45 miles from the Atlantic, and 212 S.S.W. of Madrid. Lon. 5. 59 W. Lat. 37. 14 N.

SEVOCATION. *s.* (*sevoca*, Latin.) The act of calling aside.

SEVRES (Two), a department of France, including part of the late province of Poitou. It is so named from two rivers.

To SEW. for *sue*. To follow (*Spenser*).

To SEW. *v. n.* (*suo*, Latin.) To join any thing by the use of the needle (*Eccles.*).

To SEW. *v. a.* To join by threads drawn with a needle (*Mark*).

To SEW *up*. To enclose in any thing sewed (*Shakspeare*).

To SEW. *v. a.* To drain a pond for the fish.

SEWELL (William), born in Holland, about 1654, and practised surgery at Amsterdam. He wrote the History of the Rise and Progress of the People called Quakers, and compiled a Dictionary of the English and Low Dutch Tongues. He died in 1720.

SEWELL (George), a poet and physician, born at Windsor, and educated at Eton school, from whence he was removed to Peter-house, Cambridge. He wrote the Life of John Philips, and a Vindication of the English Stage; also, Sir Walter Raleigh, a tragedy, acted at Lincoln's-inn-fields, 1719. He died in 1726.

SEWEN, in ichthyology. See SALMO.

SEWER. *s.* (*asseour*, old French.) 1. An officer who serves up a feast (*Milton*). 2. (from *issue*, *issuer*.) A passage for water to run through, now corrupted to *shore* (*Bacon*). 3. He that uses a needle.

SEWER, a passage or gutter made to carry water into the sea or a river, whereby to preserve the land, &c. from inundations and other annoyances. The business of the commissioners of sewers, or their office in particular, is to repair sea-banks and walls, survey rivers, public streams, ditches, &c. and to make orders for that purpose.

These commissioners have likewise authority to make enquiry of all nuisances or offences committed by the stopping of rivers, erecting mills, not repairing banks, bridges, &c. and to tax persons chargeable for the amending of defaults that tend to the obstruction or hindrance of the free passage of the water through its ancient courses. They may not only make a rate and assessment for repairs, but also may decree lands to be sold, in order to levy charges assessed, upon non-payment thereof, &c. But the decrees of the commissioners are to be certified into chancery, and have the king's assent, to be binding, and their proceedings are subject to the jurisdiction of the king's bench. In the making of a rate or tax, the commissioners are to assess every owner or possessor of lands in danger of receiving any damage by the waters, equally according to the quality of their lands, rents, and number of acres, and their respective portions and profits, whether it is of pasture, fishing, &c. And where no persons or lands can be known that are liable to make repairs of banks and sewers, then the commissioners are to rate the whole level. The 3 Jac. I. ordains that all ditches, banks, bridges, and water-houses, within two miles of London, adjoining to, and falling into the Thames, shall be subject to the commissioners of sewers. Also the lord-mayor, &c. may appoint persons in that case to have the power of commissioners of sewers. Persons breaking down sea-banks, whereby lands are damaged, are adjudged to be guilty of felony; and removing piles, &c. forfeit 20*l.* by 6 and 10 Geo. II. c. 32.

SEX. *s.* (*sexe*, French; *sexus*, Latin.) 1. The property by which any animal is male or female (*Milton*). 2. Womankind, by way of emphasis (*Dryden*).

SEXAGENARY, something relating to the number of sixty: thus, sexagenary or sexagesimal arithmetic, is a method of computation proceeding by sixties; such is that used in the division of a degree into sixty minutes, of the minute into sixty seconds, of the second into sixty thirds, &c. Also, sexagenary tables are tables of proportional parts, showing the product of two sexagenaries that are to be multiplied, or the quotient of the two that are to be divided.

SEXAGESIMA, the second Sunday before Lent, or the next to Shrove-sunday, so called as being about the 60th day before Easter.

SEXAGESIMALS, or SEXAGESIMAL FRACTIONS, fractions whose denominators proceed in a sexagecuple ratio; that is, a prime, or the first minute, $= \frac{1}{60}$; a second $= \frac{1}{3600}$; a third $= \frac{1}{216000}$. Anciently there were no other than sexagesimals used in astronomy; and they are still retained in many cases, though decimal arithmetic begins to grow in use now in astronomical calculations. In these fractions, which some call astronomical fractions, the denominator being always 60, or a multiple thereof, is usually omitted, and the numerator only written down: thus 4°, 59′, 32″, 50‴, 16⁗, is to be read 4 degrees, 59 minutes, 32 seconds, 50 thirds, 16 fourths, &c.

SEXA'NGLED. SEXA'NGULAR. *a.* (from *sex* and *angulus*, Latin.) Having six corners or angles; hexagonal (*Dryden*).

SEXA'NGULARLY. *ad.* (from *sexangular.*) With six angles; hexagonally.

SEXENNIAL. *a.* (*sex* and *annus*, Latin.) Lasting six years; happening once in six years.

SEXES. These, in vegetables, are, 1. Male. 2. Female. 3. Hermaphrodite. Having the two first in the same flower. 4. When they are separate, either on the same or different individuals; such plants are called androgynous. 5. When hermaphrodites are accompanied with one or both of the two first, such a plant is denominated polygamous.

SEXFID CALYX, in botany, six-cleft; as in pavia. Sexfidum nectarium. A six-cleft nectary; as in narcissus minor.

SEXLOCULAR PERICARP, in botany, a six-celled pericarp: as in asarum, aristolochia.

SEXTAIN. *s.* (from *sextans*, *sex*, Latin.) A stanza of six lines.

SEXTANS, Sextant, a sixth part of certain things. The Romans having divided their *as* into 12 ounces or uncia, the sixth part of that, or two ounces, was the sextans. Sextans was also a measure which contained two ounces of liquor, or two cyathi.

Sextans, in astronomy, a constellation of the southern hemisphere, made by Hevelius out of unformed stars. In Hevelius's catalogue it contains 11, but in the Britannic catalogue 41 stars.

SEXTANT, in mathematics, denotes the sixth part of a circle, or an arch comprehending 60 degrees. The word sextant is more particularly used for an astronomical instrument made like a quadrant, excepting that its limb only comprehends 60 degrees, but, by means of a double reflection, is made to measure any angle not exceeding 120 degrees. The use and application of the sextant is the same with that of the quadrant. See Quadrant and Navigation.

SE'XTARY. *s.* A pint and a half.

Se'xtary. Se'xtry. *s.* The same as *sacristy.*

SE'XTILE. *a.* (*sextilis*, Latin.) Is the position or aspect of two planets when they are at sixty degrees distance, or at the distance of two signs from one another. See Aspect.

SEXTILIUS, a governor of Africa, who ordered Marius, when he landed there, to depart immediately from his province. Marius heard this with some concern, and said to the messenger, "Go and tell your master that you have seen the exiled Marius sitting on the ruins of Carthage."

SEXTIUS (Quintus), a Pythagorean philosopher, flourished in the time of Augustus. He seemed formed to rise in the republic; but he shrunk from civil honours, and declined accepting the rank of senator when it was offered him by Julius Cæsar, that he might have time to apply to philosophy. It appears that he wished to establish a school at Rome, and that his tenets, though chiefly drawn from the doctrines of Pythagoras, in some particulars resembled those of the Stoics. He soon found himself involved in many difficulties. His laws were tinctured with great severity; and in an early period of his establishment he found his mind so harassed, and the harshness of the doctrines which he wished to establish so repulsive to his feelings, that he had nearly worked himself up to such a height of desperation as to resolve on putting a period to his existence. Of the school of Sextius were Fabianus, Sotion, Flavianus, Crassitius, and Celsus.

SEXTON (corrupted from *sacristan*), a church officer, whose business is to take care of the vessels, vestments, &c. belonging to the church, and to attend the minister, churchwardens, &c. at church. He is usually chosen by the parson only. The office of sexton, in the Pope's chapel, is appropriated to the order of the hermits of St. Augustine. He is generally a bishop, though sometimes the Pope only gives a bishopric in particular to him on whom he confers the post: he takes the title of prefect of the Pope's sacristy, and has the keeping of the vessels of gold and silver, the relics, &c. When the pope says mass, the sexton always tastes the bread and wine first. If it be in private he says mass, his holiness, of two wafers gives him one to eat; and if in public, the cardinal who assists the pope in quality of deacon, of three wafers gives him one to eat. When the pope is very sick, he administers to him the sacrament of extreme unction, &c. and enters the conclave in quality of first conclavist.

SE'XTONSHIP. *s.* (from *sexton.*) The office of a sexton (*Swift*).

SE'XTUPLE. *a.* (*sextuplus*, Latin.) Sixfold; six times told (*Brown*).

SEXTUS (Empiricus), an ancient Greek author, and defender of the Pyrrhonian, or sceptical philosophy, practised as a physician, and flourished A. D. 180. Of a great many of his works two only are extant, one of these books on Pyrrhonian Institutions, the other in two books, against the Mathematici, by whom he meant all kinds of dogmatists.

Sextus, a Stoic philosopher, born at Cheronæa, in Bœotia. He is supposed by some to be Plutarch's nephew, and was preceptor to M. Aurelius, and L. Verus.

Sextus, a philosopher, in the reign of Antoninus, some of whose works are still extant. He was a follower of the doctrines of Pyrrho.

SEXUAL ACTION. Sexual functions. Those functions proper to each sex, by which the species is propagated, as the excretion of semen in men; menstruation, conception, the evolution of the fetus, parturition, &c. in women.

Sexual system. Linnéan system of plants. The sexual system of plants taught as early as the days of Empedocles, believed in by Aristotle, and taught again by Theophrastus, was only completely confirmed by the labours of the immortal Linnéus, professor of physic and botany at Upsal, in Sweden. It is founded on the parts of fructification, viz. the stamens and pistills; these having been observed with more

accuracy since the discovery of the uses for which nature has assigned them, a new set of principles have been derived from them, by means of which the distribution of plants has been brought to a greater precision, and rendered more conformable to true philosophy, in this system than in any one of those which preceded it. The author does not pretend to call it a natural system, he gives it as artificial only, and modestly owns his inability to detect the order pursued by nature in her vegetable productions; but of this he seems confident, that no natural order can ever be framed without taking in the materials out of which he has raised his own; and urges the necessity of admitting artificial systems for convenience, till one truly natural shall appear. Linnéus has given us his Fragmenta methodi naturalis, in which he has made a distribution of plants under various orders, putting together in each such as appear to have a natural affinity to each other; this, after a long and fruitless search after the natural method, he gives as the result of his own speculation, for the assistance of such as may engage in the same pursuit.

Not able to form a system after the natural method, Linnéus was more fully convinced of the absolute necessity of adopting an artificial one. For the student to enter into the advantages this system maintains over all others, it is necessary that he be instructed in the science of botany, which will amply repay him for his enquiry. See the article BOTANY.

SFORZA (James), styled the Great, count de Corignoli, a celebrated warrior, born in 1369. He was the son of a labourer, but by his military talents ennobled his family, and was the founder of the house of the Sforzas, dukes of Milan. He was drowned in passing the river Pescara, in pursuit of Alphonso, king of Arragon, in 1424.

SFORZA (Francis), natural son of the preceding, became eminent. He served under his father, and was present at his melancholy death, and continued the war against Alphonso. He afterwards served Joan of Naples, and her successor, and his reputation was such that he was chosen by the pope, the Venetians, and Florentines, their general, against the duke of Milan, though he had married his daughter. The death of the duke changed the face of affairs, 1447, Sforza was appointed general of the Milanese against Venice, and turning his arms against his employers, he obliged them to name him duke of Milan, an honour which was acknowledged by the French general, and to which afterwards was added the sovereignty of Genoa. He died 1466.

SFORZA (Galeas-Marie), succeeded his father Francis at Milan; but his debaucheries revolted the affections of the people, and he was assassinated 10 years after, 1476. His son, John Galeas-Marie, was for a little time under the guardianship of his mother, but the government was seized by his uncle, Ludovic-Marie, a monster of iniquity, who by slow poison cut him off 1494.

SFORZANDO, and SFORZATO. (Ital.) Words signifying that the notes over which they are placed are to be struck with force, but continued with comparative softness.

To SHAB. *v. n.* To play mean tricks.

SHA'BBILY. *ad.* (from *shabby*.) Meanly; reproachfully; despicably.

SHA'BBINESS. *s.* (from *shabby*.) Meanness; paltriness (*Addison*).

SHA'BBY. *a.* Mean; paltry (*Swift*).

SHACK, in ancient customs, a liberty of winter-pasturage. In the counties of Norfolk and Suffolk, the lord of the manor has shack, i. e. a liberty of feeding his sheep at pleasure in his tenants lands, during the six winter months.

In Norfolk, shack also extends to the common for hogs, in all men's grounds, from the end of harvest till seed-time. Whence, to go a-shack, is to feed at large.

To SHA'CKLE. *v. a.* (*shaecklen*, Dutch.) To chain; to fetter; to bind (*Smith*).

SHA'CKLES. *s.* wanting the singular. (ꝛeacul, Saxon; *schaeckles*, Dutch.) Fetters; gyves; chains for prisoners (*South*).

SHACKLES, aboard a ship, are those oblong iron rings, bigger at one end than at the other, with which the ports are shut fast, by thrusting the wooden bar of the port through them. There is also a sort of shackles to lift the hatches up with, of a like figure, but smaller. They are fastened at the corners of the hatches.

SHAD, in ichthyology. See CLUPEA.

SHADDOCK, in botany. See CITRUS.

SHADE. *s.* (ꝛcaꝺu, Saxon; *schade*, Dutch.) 1. The cloud of opacity made by interception of the light (*Milton*). 2. Darkness; obscurity (*Roscommon*). 3. Coolness made by interception of the sun (*Milton*). 4. An obscure place, properly in a grove or close wood, by which the light is excluded (*Milton*). 5. Screen causing an exclusion of light or heat; umbrage (*Arbuthnot*). 6. Protection; shelter. 7. The parts of a picture not brightly coloured (*Dryd.*). 8. A variation of colour; gradation of light (*Locke*). 9. The figure formed upon any surface corresponding to the body by which the light is intercepted; the shadow (*Pope*). 10. The soul separated from the body; so called as supposed by the ancients to be perceptible to the sight, not to the touch. A spirit; a ghost; manes (*Tickel*).

To SHADE. *v. a.* (from the noun.) 1. To overspread with opacity (*Milton*). 2. To cover from the light or heat; to overspread (*Dryd.*). 3. To shelter; to hide (*Shakspeare*). 4. To protect; to cover; to screen (*Milton*). 5. To mark with different gradations of colours (*Milton*). 6. To paint in obscure colours.

SHA'DINESS. *s.* (from *shady*.) The state of being shady; umbrageousness.

SHA'DOW. *s.* (ꝛcaꝺu, Saxon; *schaduwe*, Dutch.) 1. The representation of a body by which the light is intercepted (*Shakspeare*). 2. Opacity; darkness; shade (*Addison*). 3. Shelter made by any thing that intercepts the light, heat, or influence of the air (*Shaksp.*). 4. Obscure place (*Dryden*). 5. Dark part of

a picture (*Peacham*). 6. Any thing perceptible only to the sight; a ghost; a spirit, or shade (*Shakspeare*). 7. An imperfect and faint representation: opposed to *substance* (*Raleigh*). 8. Inseparable companion (*Milton*). 9. Type; mystical representation (*Milton*). 10. Protection; shelter; favour (*Psalms*).

To SHA'DOW. *v. a.* (from the noun.) 1. To cover with opacity (*Ezekiel*). 2. To cloud; to darken (*Shakspeare*). 3. To make cool, or gently gloomy, by interception of the light or heat (*Sidney*). 4. To conceal under cover; to hide; to screen (*Shakspeare*). 5. To protect; to screen from danger; to shroud (*Shaksp.*). 6. To mark with various gradations of colour, or light (*Addison*). 7. To paint in obscure colours (*Dryden*). 8. To represent imperfectly (*Milton*). 9. To represent typically (*Hooker*).

SHADOW, in geography. The inhabitants of the terraqueous globe of the earth receive different denominations, according to the different ways wherein their shadows are projected; as ASCII, AMPHISCII, HETEROSCII, and PERISCII. See the respective words.

SHADOW, shade, in optics, a certain space deprived of light, or where the light is weakened by the interposition of some opaque body before the luminary.

The doctrine of shadows makes a considerable article in optics, astronomy, and geography; and is the general foundation of dialling.

As nothing is seen but by light, a mere shadow is invisible; and, therefore, when we say we see a shadow, we mean partly, that we see bodies placed in the shadow, and illuminated by light reflected from collateral bodies, and partly that we see the confines of the light.

When the opaque body that projects the shadow is perpendicular to the horizon, and the plane it is projected on is horizontal, the shadow is called a right one: such as the shadows of men, trees, buildings, mountains, &c. But when the body is placed parallel to the horizon, it is called a versed shadow; as the arms of a man when stretched out, &c.

Laws of the Projection of Shadows.—1. Every opaque body projects a shadow in the same direction with the rays of light; that is, towards the part opposite to the light. Hence, as either the luminary or the body changes place, the shadow likewise changes its place.

2. Every opaque body projects as many shadows as there are luminaries to enlighten it.

3. As the light of the luminary is more intense, the shadow is the deeper. Hence, the intensity of the shadow is measured by the degrees of light that space is deprived of. In reality, the shadow itself is not deeper; but it appears so, because the surrounding bodies are more intensely illuminated.

4. When the luminous body and opaque one are equal, the shadow is always of the same breadth with the opaque body. But when the luminous body is the larger, the shadow grows always less and less, the farther from the body. And when the luminous body is the smaller of the two, the shadow increases always the wider, the farther from the body. Hence, the shadow of an opaque globe is, in the first case a cylinder, in the second case it is a cone verging to a point, and in the third case a truncated cone that enlarges still the more the farther from the body. Also, in all these cases, a transverse section of the shadow, by a plane, is a circle, respectively, in the three cases, equal, less, or greater than a great circle of the globe.

Mr. Simpson, and other ingenious mathematicians, have investigated the curve which the shadow of the vertex of any object describes upon the plane of the horizon of any place, during the sun's apparent diurnal revolution, neglecting refraction. The results of their investigations are contained in the following particulars: 1. In all cases where the sun's declination is greater than the compliment of the latitude, the curve described will be an ellipse. 2. When the declination is equal to the co-latitude, the path of the vertical shadow is a parabola. 3. When the declination is less than the co-latitude, the curve is an hyperbola. 4. When the sun is in the equinox, the hyperbola degenerates into a right line. 5. If the perpendicular altitude of the vertex of an object above the horizon be put $= h$, the sine of the latitude $= b$, its cosine $= c$, the sine of the declination $= d$, its cosine $= p$: then, in No. 1, we shall have $\frac{2pdh}{d^2 - c^2}$ and $\frac{2ph}{(d^2 - c^2)^{\frac{1}{2}}}$, for the transverse and conjugate axes, and $\frac{2ph}{d}$ for the parameter of the ellipse: in No. 2, we have $\frac{2bh}{c}$ for the parameter of the parabola: and, in No. 3, we have $\frac{2hpd}{c^2 - d^2}$ and $\frac{2ph}{\sqrt{c^2 - d^2}}$, for the transverse and conjugate axes, and $\frac{2ph}{d}$ for the parameter of the hyperbola. 6. If the south side of a plane (before horizontal) be elevated so as to make an angle with the plane of the horizon equal to the excess of the co-declination above the latitude, the plane always continuing perpendicular to the meridian, the shadow of the summit of any object upon it will be a parabola; if it be elevated more, the shadow will be the segment of an ellipse. 7. At either pole, where the sun continues above the horizon while it passes through six signs of the ecliptic, the shadow of the summit of an object upon the plane of the horizon is a kind of spiral: for example, at the north pole, when the sun enters Aries, the extremity of the shadow is at an infinite distance; but as the sun advances, the extremity of the shadow draws nearer and nearer, in the manner of a spiral, making one revolution about the centre in every 24 hours, until the sun enters Cancer, when the path of the shadow in one day is extremely near a circle, the semi-diameter of which is equal to the altitude of the object

which casts the shadow, multiplied into the co-tangent of the sun's declination: from this period a similar spiral is described back again, by steps the reverse of those before traced out, until the autumnal equinox, when its extremity is again at an infinite distance. The more minute investigation of this curve we propose to the attention of the mathematicians.

SHADOW, in painting, an imitation of a real shadow, effected by gradually heightening and darkening the colours of such figures as by their dispositions cannot receive any direct rays from the luminary that is supposed to enlighten the piece. The management of the shadows and lights makes what the painters call clare-obscuro.

SHADOW, in perspective. The appearance of an opaque body and a luminous one, whose rays diverge (e. gr. a candle, lamp, &c.) being given; to find the just appearance of the shadow, according to the laws of perspective. The method is this: from the luminous body, which is here considered as a point, let fall a perpendicular to the perspective plane or table; i. e. find the appearance of a point upon which a perpendicular, drawn from the middle of the luminary, falls on the perspective plane; and from the several angles, or raised points of the body, let fall perpendiculars to the plane. These points whereon the perpendiculars fall, connect by right lines, with the point upon which the perpendicular let fall from the luminary, falls; and continue the lines to the side opposite to the luminary. Lastly, through the raised points, draw lines through the centre of the luminary, intersecting the former; the points of intersection are the terms or bounds of the shadow.

We may observe, that it makes no difference in the shadow, whatever be the height or shape of objects, provided their tops and every part of them be in the same right lines proceeding from the luminous body.

As for those shadows that are intercepted by other objects, it may be observed, that when the shadow of a line falls upon any object, it must necessarily take the form of that object. If it fall upon another plane, it will be a right line; and if upon a globe or cylinder, it will be circular. If the body intercepting it be a plane, whatever be the situation of it, the shadow falling upon it might be found by producing that plane, till it intercepted the perpendicular let fall upon it from the luminous body; for then a line drawn from that point would determine the shadow, just as if no other plane had been concerned. But the appearance of all these shadows may be drawn with less trouble, by first drawing it through these interposed objects, as if they had not been in the way, and then making the shadow to ascend perpendicularly up every perpendicular plane, and obliquely on those that are situated obliquely, in the manner described by Dr. Priestley, *ubi infra*.

Here we may observe in general, that since the shadows of all objects which are cast upon the ground will vanish into the horizontal line; so, for the same reason, the vanishing points of all shadows which are cast upon any inclined or other plane, will be somewhere in the vanishing line of that plane.

When objects are not supposed to be viewed by the light of the sun, or of a candle, but only in the light of a cloudy day, or in a room into which the sun does not shine, there is no sensible shadow of the upper part of the object, and the lower part only makes the neighbouring parts of the ground on which it stands a little darker than the rest. This imperfect obscure kind of shadow is easily made, being nothing more than a shade on the ground opposite to the side on which the light is supposed to come; and it may be continued to a greater or less distance, according to the supposed brightness of the light by which it is made. It is in this manner (in order to save trouble, and sometimes to prevent confusion) that the shadows in most drawings are made. See on the subject of this article Priestley's Treatise on Perspective, part ii. p. 73, &c. and Taylor's Method of Perspective, by Kirby, book ii. chap. 4.

SHA'DOWY. *a.* (from *shadow*.) 1. Full of shade; gloomy (*Fenton*). 2. Not brightly luminous (*Milton*). 3. Faintly representative; typical (*Milton*). 4. Unsubstantial; unreal (*Addison*). 5. Dark; opake (*Milton*).

SHA'DY. *a.* (from *shade*.) 1. Full of shade; mildly gloomy (*Dryden*). 2. Secure from the glare of light, or sultriness of heat (*Bacon*).

SHAFT. *s.* (ꝑceaft, Saxon.) 1. An arrow; a missive weapon (*Wall.*). 2. (*shaft*, Dutch.) A narrow, deep, perpendicular pit (*Arbuthnot*). 3. Any thing straight; the spire of a church.

SHAFT OF A COLUMN, in building, is the body thereof between the base and capital: so called from its straightness. The term shaft is also used for the spire of a church steeple, and for the tunnel of a chimney. See ARCHITECTURE.

SHAFT, in botany, is sometimes used to denote the style.

SHAFT, in mechanics, the axle on which a wheel, or series of wheels, turns. It denotes, also, either of the straight horizontal bars which supports a cart, and to which the horse is harnessed.

SHAFT, in ornithology. See TROCHILUS.

SHAFTSBURY, a borough in Dorsetshire, governed by a mayor, with a market on Saturday. It stands on a hill, where water is so scarce, that the poor get a living by fetching it from a great distance; and it had formerly 10 parish churches, which are now reduced to three. It is 25 miles N.N.E. of Dorchester, and 100 W. by S. of London.

SHAFTSBURY, a town of Vermont, in Bennington county, 10 miles N. of Bennington.

SHAG, in ornithology. See PELECANUS.

SHAG. *s.* (ꝑceaȝa, Saxon.) 1. Rough woolly hair (*Grew*). 2. A kind of cloth.

SHA'GGED. SHA'GGY. *a.* (from *shag*.) 1. Rugged; hairy (*Dryden*). 2 Rough; rugged (*Milton*).

SHAGREEN, or CHAGREEN, in commerce, a kind of grained leather, prepared, as is supposed, of the skin of a species of squalus, or hound-fish, called the shagree, or shagrain, and much used in covering cases, books, &c. It is imported from Constantinople, Tauris, Tripoli, Algiers, and from some parts of Poland, where it is prepared in the following manner: the skin being stretched out, is first covered over with mustard seed, which is bruised upon it: and being thus exposed to the weather for some days, it is then tanned. The best is of a brownish colour, as the white sort is the worst: it is extremely hard; yet, when steeped in water, it becomes soft and pliable; and being fashioned into case covers, it readily takes any colour, as red, green, yellow, black, according to the fancy of the workman.

To SHA'GREEN. *v. a.* (*chagriner*, French.) To irritate; to provoke.

To SHAIL. *v. n.* To walk sidewise, A low word (*L'Estrange*).

To SHAKE. *v. a.* preterit, *shook*; part. pass. *shaken* or *shook*. (ꝛceacan, Saxon; *shecken*, Dutch.) 1. To put into a vibrating motion; to move with quick returns backward and forward; to agitate (*Shakspeare*). 2. To make to totter or tremble (*Roscommon*). 3. To throw down by a violent motion (*Tatler*). 4. To throw away; to drive off (*Shakspeare*). 5. To weaken; to put in danger (*Atterbury*). 6. To drive from resolution, to depress; to make afraid (*Shakspeare*). 7. *To* SHAKE *hands*. This phrase, from the action used among friends at meeting and parting, sometimes signifies to *join with*, but commonly to *take leave of* (*Shakspeare*). 8. *To* SHAKE *off*. To rid himself of; to free from; to divest of (*Stillingfleet*).

To SHAKE. *v. n.* 1. To be agitated with a vibratory motion. 2. To totter (*Milton*). 3. To tremble; to be unable to keep the body still (*Shakspeare*). 4. To be in terrour; to be deprived of firmness (*Dryden*).

SHAKE. *s.* (from the verb.) 1. Concussion suffered (*Herbert*). 2. Impulse; moving power (*Addison*). 3. Vibratory motion (*Addison*). 4. Motion given and received (*Addison*).

SHAKE. An embellishment consisting of the alternate reiteration of two notes comprehending an interval not greater than one whole tone, nor less than a semitone. See GRUPPA.

SHA'KER. *s.* (from *shake*.) The person or thing that shakes (*Pope*).

SHAKER, in ornithology. See COLUMBA.

SHAKESPEARE or SHAKSPEARE (William), the prince of dramatic writers, was born at Stratford upon Avon, in Warwickshire, on the 23d of April, 1564. From the register of that town, it appears that a plague broke out there on the 30th of June following, which raged with great violence; but fortunately it did not reach the house in which this infant prodigy lay. His father, John Shakespeare, enjoyed a small patrimonial estate, and was a considerable dealer in wool; his mother was the daughter and heir of Robert Arden of Wellingcote. Our illustrious poet being designed for the business of his father, received no better education than the instructions which the free-school of Stratford could afford. After applying some time to the study of Latin, he was called home to assist his father, who seems by some accident to have been reduced in his circumstances. Before arriving at the age of 19, he married the daughter of Mr. Hathaway, a substantial yeoman in the neighbourhood of Stratford. This lady was eight years older than her husband. Having the misfortune to fall into bad company, he was seduced into some profligate actions, which drew on him a criminal prosecution, and at length forced him to take refuge in the capital. In concert with his associates, he broke into a park belonging to sir Thomas Lucy, of Charlecote, and carried off some of his deer. Every admirer of Shakespeare will regret that such a blemish should have stained his character: but, perhaps, if any thing can extenuate his guilt, we might ascribe it to the opinions of the age, which, perhaps, as was formerly the case in Scotland, might not distinguish the killing of deer by any mark of disgrace, or any charge of criminality. One thing at least is certain, that Shakespeare himself thought that the prosecution which sir Thomas raised against him was carried on with too great severity; an opinion which he could not have entertained had this action been at that time viewed in the same criminal light as it is at present. Shakespeare testified his resentment against sir Thomas, by writing a satirical ballad, which exasperated him so much, that the process was carried on with redoubled violence; and the young poet, in order to avoid the punishment of the law, was obliged to make his escape. This ballad would be considered as a curious relic, on account of its being the first production of Shakespeare; it would also be interesting to peruse a poem which could irritate the baronet to so high a degree. Tradition has preserved the first stanza:

A parliamente member, a justice of peace,
At home a poor scare-crow, at London an asse,
If lowsie is Lucy, as some volke miscalle it,
Then Lucy is lowsie whatever befall it:
He thinks himself greate,
Yet an asse in his state,
We allowe by his ears, but with asses to mate.
If Lucy is lowsie, as some volke miscalle it,
Sing lowsie Lucy whatever befall it.

If the rest of the ballad was of a piece with this stanza, it might assist us in forming some opinion of the irritability of the baronet, but will enable us to form no idea of the opening genius of Shakespeare.

Thus expelled from his native village, he repaired to London, where he was glad to accept a subordinate office in the theatre. It has been said that he was first engaged, while the play was acting, in holding the horses of those who rode to the theatre; but this story rests on a slender foundation. As his name is found printed among those of the other players before some old plays, it is probable that he was

some time employed as an actor; but we are not informed what characters he played; we are only told, that the part which he acted best was that of the ghost in Hamlet; and that he appeared in the character of Adam, in As you like it. If the names of the actors prefixed to Ben Jonson's play of Every Man in his Humour were arranged in the same order as the persons represented, which is very probable, Shakespeare played the part of Old Knowell. We have reason therefore to suppose, as far as we can argue from these few facts, that he generally represented old men. See Malone's Chronology, in his edition of Shakespeare.

But though he was not qualified to shine as an actor, he was now in the situation which could most effectually rouse those latent sparks of genius which afterwards burst forth with so resplendent a flame. Being well acquainted with the mechanical business of the theatre and the taste of the times; possessed of a knowledge of the characters of men resembling intuition, an imagination that ranged at large through nature, selecting the grand, the sublime, and the beautiful; a judicious caution, that disposed him to prefer those plots which had already been found to please; an uncommon fluency and force of expression; he was qualified at once to eclipse all who had gone before him.

Notwithstanding the unrivalled genius of Shakespeare, most of his plots were the invention of others; which, however, he certainly much improved, if he did not entirely new-model. We are assured, that prior to the theatrical compositions of Shakespeare, dramatic pieces were written on the following subjects, viz. King John, King Richard II. and III. King Henry IV. and V. King Henry VIII. King Lear, Antony and Cleopatra, Measure for Measure, the Merchant of Venice, the Taming of a Shrew, and the Comedy of Errors.

In the beginning of the year 1616, he made his will, wherein he testified his respect to his quondam partners in the theatre: he appointed his youngest daughter, jointly with her husband, his executors, and bequeathed to them the best part of his estate, which they came into the possession of not long after. He died on the 23d of April following, being the 53d year of his age; and was interred among his ancestors on the north side of the chancel, in the great church of Stratford, where there is a handsome monument erected for him, inscribed with the following elegiac distich in Latin:

Judicio Pylium, genio Socratem, arte Maronem,
Terra tegit, Populus mæret, Olympus habet.

In the year 1740, another very noble one was raised to his memory, at the public expence, in Westminster-abbey; an ample contribution for this purpose being made upon exhibiting his tragedy of Julius Cæsar, at the theatre-royal in Drury-lane, April 28th, 1738.

Nor must we omit mentioning another testimony of the veneration paid to his manes by the public in general, which is, that a mulberry-tree planted upon his estate by the hands of this revered bard was cut down not many years ago; and the wood being converted to several domestic uses, was all eagerly bought at a high price, and each single piece treasured up by its purchaser as a precious memorial of the planter.

The character of Shakespeare as a dramatic writer has been often drawn, but perhaps never with more accuracy than by the pen of Dr. Johnson: "Shakespeare," says he, "is above all writers, at least above all modern writers, the poet of nature; the poet that holds up to his readers a faithful mirror of manners and of life. His characters are not modified by the customs of particular places, unpractised by the rest of the world; by the peculiarities of studies or professions, which can operate but upon small numbers; or by the accidents of transient fashions or temporary opinions: they are the genuine progeny of common humanity, such as the world will always supply, and observation will always find. His persons act and speak by the influence of those general passions and principles by which all minds are agitated, and the whole system of life is continued in motion. In the writings of other poets, a character is too often an individual; in those of Shakespeare, it is commonly a species.

"It is from this wide extension of design that so much instruction is derived. It is this which fills the plays of Shakespeare with practical axioms and domestic wisdom. It was said of Euripides, that every verse was a precept; and it may be said of Shakespeare, that from his works may be collected a system of civil and economical prudence. Yet his real power is not shown in the splendor of particular passages, but by the progress of his fable, and the tenor of his dialogue; and he that tries to recommend him by select quotations, will succeed like the pedant in Hierocles, who, when he offered his house to sale, carried a brick in his pocket as a specimen.

"Upon every other stage the universal agent is love, by whose power all good and evil is distributed, and every action quickened or retarded. But love is only one of many passions; and as it has no great influence upon the sum of life, it has little operation in the dramas of a poet who caught his ideas from the living world, and exhibited only what he saw before him. He knew that any other passion, as it was regular or exorbitant, was a cause of happiness or calamity.

"Characters thus ample and general were not easily discriminated and preserved; yet perhaps no poet ever kept his personages more distinct from each other.

"Other dramatists can only gain attention by hyperbolical or aggravated characters, by fabulous and unexampled excellence, or depravity, as the writers of barbarous romances invigorated the reader by a giant and a dwarf;

and he that should form his expectations of human affairs from the play, or from the tale, would be equally deceived. Shakespeare has no heroes, his scenes are occupied only by men, who act and speak as the reader thinks that he should himself have spoken or acted on the same occasion: even where the agency is supernatural, the dialogue is level with life. Other writers disguise the most natural passions and most frequent incidents; so that he who contemplates them in the book will not know them in the world: Shakespeare approximates the remote, and familiarizes the wonderful; the event which he represents will not happen, but, if it were possible, its effects would probably be such as he has assigned; and it may be said, that he has not only shown human nature as it acts in real exigencies, but as it would be found in trials to which it cannot be exposed.

"This, therefore, is the praise of Shakespeare, that his drama is the mirror of life; that he who has mazed his imagination in following the phantoms which other writers raise up before him, may here be cured of his delirious ecstasies, by reading human sentiments in human language; by scenes from which a hermit may estimate the transactions of the world, and a confessor predict the progress of the passions."

The learning of Shakespeare has frequently been a subject of inquiry. That he possessed much classical knowledge does not appear, yet he was certainly acquainted with the Latin poets, particularly with Terence, as Colman has justly remarked, which appears from his using the word *thrasonical*. Nor was he unacquainted with French and Italian. We are indeed told, that the passages in which these languages occur might be impertinent additions of the players; but is it probable, that any of the players so far surpassed Shakespeare?

That much knowledge is scattered over his works is very justly observed by Pope; but it is often such knowledge as books did not supply. "There is, however, proof enough," says Dr. Johnson, "that he was a very diligent reader; nor was our language then so indigent of books, but that he might very liberally indulge his curiosity without excursion into foreign literature. Many of the Roman authors were translated, and some of the Greek; the Reformation had filled the kingdom with theological learning; most of the topics of human disquisition had found English writers; and poetry had been cultivated, not only with diligence, but success. This was a stock of knowledge sufficient for a mind so capable of appropriating and improving it."

The works of Shakespeare consist of 35 dramatic pieces. The following is the chronological order which Mr. Malone has endeavoured to establish, after a minute investigation, in which he has in general been successful:

1.	First Part of King Henry VI.	1589
2.	Second Part of King Henry VI.	1591
3.	Third Part of King Henry VI.	1591
4.	A Midsummer Night's Dream	1592
5.	Comedy of Errors	1593
6.	Taming of the Shrew	1594
7.	Love's Labour Lost	1594
8.	Two Gentlemen of Verona	1595
9.	Romeo and Juliet	1595
10.	Hamlet	1596
11.	King John	1596
12.	King Richard II.	1597
13.	King Richard III.	1597
14.	First Part of King Henry IV.	1597
15.	Second Part of King Henry IV.	1598
16.	The Merchant of Venice	1598
17.	All's Well that Ends Well	1598
18.	King Henry V.	1599
19.	Much Ado about Nothing	1600
20.	As You Like It	1600
21.	Merry Wives of Windsor	1601
22.	King Henry VIII.	1601
23.	Troilus and Cressida	1602
24.	Measure for Measure	1603
25.	The Winter's Tale	1604
26.	King Lear	1605
27.	Cymbeline	1605
28.	Macbeth	1606
29.	Julius Cæsar	1607
30.	Antony and Cleopatra	1608
31.	Timon of Athens	1609
32.	Coriolanus	1610
33.	Othello	1611
34.	The Tempest	1612
35.	Twelfth Night	1614

The three first of these, Mr. Malone thinks, there is very strong reason to believe, are not the original productions of Shakespeare; but that he probably altered them, and added some new scenes. Titus Andronicus is also excluded: and so ought to be Love's Labour Lost, and The Comedy of Errors, the latter being clearly taken from the Menœchini of Plautus.

In the first folio edition in 1623, these plays were entitled "Mr. William Shakespeare's Comedies, Histories, and Tragedies." They have been published by various editors. The first folio edition by Isaac Jaggard and Edward Blount; the second folio, 1632, by Thomas Cotes for Robert Allot; the third, 1664, for P. C.; the fourth, 1685, for H. Herringman, E. Brewster, and R. Bentley. Rowe published an 8vo. edition in 1709, in 7 vols. and a 12mo. edition in 1714, in 9 vols.; for which he received 36*l.* 10*s.* Pope published a 4to. edition in 1725, in 6 vols. and a 12mo. in 1728, in 10 vols.; for which he was paid 217*l.* 12*s.* Theobald gave a new edition in 8vo. in 1733, in 7 vols. another in 12mo. in 1740, in 8 vols.; and received for his labour 652*l.* 10*s.* Sir Thomas Hanmer published an edition in 1744, in 6 vols. 4to. Dr. Warburton's 8vo. edition came out in 1747, in 8 vols.; for which he was paid 560*l.* The editions published since that time, are Dr. Johnson's in 1765, in 8 vols. 8vo. Stevens's in 1766, in 4 vols. 8vo. Capell's in 1768, in 10 vols. crown 8vo; for this the author was paid 300*l.* A second edition of Hanmer's in 1771, 6 vols. Johnson's and Stevens's in 1773, in 10 vols. 8vo; a second

edition in 1778; a third by Reed in 1785, and Malone's crown 8vo. edition in 1789, in 10 vols.

The most authentic of the old editions is that of 1623. "At last," says Dr. Johnson, "an edition was undertaken by Rowe; not because a poet was to be published by a poet, for Rowe seems to have thought very little on correction or explanation, but that our author's works might appear like those of his fraternity, with the appendages of a life and recommendatory preface. Rowe has been clamorously blamed for not performing what he did not undertake; and it is time that justice be done him, by confessing, that though he seems to have had no thought of corruption beyond the printer's errors, yet he has made many emendations, if they were not made before, which his successors have received without acknowledgment, and which, if they had produced them, would have filled pages with censures of the stupidity by which the faults were committed, with displays of the absurdities which they involved, with ostentatious expositions of the new reading, and self-congratulations on the happiness of discovering it."

The nation had been for many years content enough with Mr. Rowe's performance, when Mr. Pope made them acquainted with the true state of Shakespeare's text, showed that it was extremely corrupt, and gave reason to hope that there were means of reforming it. Mr. Pope's edition, however, he observes, fell below his own expectations; and he was so much offended, when he was found to have left any thing for others to do, that he passed the latter part of his life in a state of hostility with verbal criticism.

The only task, in the opinion of Mr. Malone, for which Pope was eminently and indisputably qualified, was to mark the faults and beauties of his author.—When he undertook the office of a commentator, every anomaly of language, and every expression that was currently in use, were considered as errors or corruptions, and the text was altered or amended, as it was called, at pleasure. Pope is openly charged with being one of the great corrupters of Shakespeare's text.

Pope was succeeded by Theobald, who collated the ancient copies, and rectified many errors. He was, however, a man of narrow comprehension and of little learning, and what is worse, in his reports of copies and editions, he is not to be trusted without examination. From the liberties taken by Pope, the edition of Theobald was justly preferred, because he professed to adhere to the ancient copies more strictly, and illustrated a few passages by extracts from the writers of our poet's age. Still, however, he was a considerable innovator; and while a few arbitrary changes made by Pope were detected, innumerable sophistications were silently adopted.

Sir Thomas Hanmer, who comes next, was a man of critical abilities, and of extensive learning. His corrections are commonly just, but sometimes capricious. He is censurable, too, for receiving without examination almost all the innovations of Pope.

The original and predominant error of Warburton's commentary, is acquiescence in his first thoughts; that precipitation which is produced by consciousness of quick discernment; and that confidence which presumes to do, by surveying the surface, what labour can only perform by penetrating to the bottom. His notes exhibit sometimes perverse interpretations, and sometimes improbable conjectures; he at one times gives the author more profundity of meaning than the sentence admits, and at another discovers absurdities where the sense is plain to every other reader. But his emendations are likewise often happy and just; and his interpretation of obscure passages learned and sagacious.

It has indeed been said by his defenders, that his great object was to display his own learning; and certainly, in spite of the clamour raised against him for substituting his own chimerical conceits instead of the genuine text of Shakespeare, his work increased his reputation. But as it is of little value as a commentary on Shakespeare, since Warburton is now gone, his work will probably soon sink into oblivion.

In 1765 Dr. Johnson's edition, which had long been impatiently expected, was given to the public. His vigorous and comprehensive understanding threw more light on his author than all his predecessors had done. The character which he gave of each play is generally just. His refutation of the false glosses of Theobald and Warburton, and his numerous explications of involved and difficult passages, entitle him to the gratitude of every admirer of Shakespeare.

Subsequent editors are Malone, Stevens, Reed, and Chalmers.

We have only further to add, that in the year 1790 a copious index to the remarkable passages and words in the plays of Shakespeare was published by the Reverend Mr. Ayscough. In fine, the admirers of Shakespeare are now, by the labours of several eminent men, furnished with every help that can enable them to understand the sense, and to taste the beauties of this illustrious poet.

SHALE, in mineralogy. See SCHISTUS.

SHALE. *s.* (corrupted for *shell.*) A husk; the case of seeds in siliquous plants (*Shaksp.*).

SHALL. *v. defective.* (rceal, Sax.) It has no tenses but *shall* future, and *should* imperfect.

An ingenious writer in the Athenæum has the following remarks on *shall* and *will.*

"The various writers on English grammar have scarcely explained, with sufficient precision, the proper use of the verbs *shall* and *will*, with the preterites *should* and *would.* Many persons consider the just application of these verbs as a sort of *shiboleth*, a test of a true-born Englishman, for which no rule can be given, and which no foreigners, not even our fellow-subjects of Scotland and Ireland, can ever learn. The latter is undeniable, and it is equally true that an Englishman,

however uneducated, will never, except corrupted by an intercourse with strangers, commit an error in this respect. Nevertheless, before we indulge in triumph over other people, it becomes us to give, if possible, a reason for our own conduct; nor ought any reproach to fall on those who, in learning a language, err on a point concerning which no rule can be given.

"Allow me therefore to suggest that *shall* and *will* are two distinct verbs, *which interchange their meanings in the different persons. Shall* and *should* express, in the first person, simple futurity, but in the second and third persons they imply a command or decision of the speaker. On the contrary, *will* and *would* in the first person imply the same command or decision, while in the second and third they express only simple futurity. There is, however, a third verb, *will*, in every one of the three persons, which expresses the decision of the person spoken of.

"This is best understood by a table of each verb and its tenses.

N° 1 expresses simple futurity.	N° 2, The decision of the speaker.	N° 3, The decision of the party spoken of.
I shall	I will	I will
Thou wilt	Thou shalt	Thou wilt
He will	He shall	He will
We shall	We will	We will
You will	You shall	You will
They will	They shall	They will
	Preterite.	
I should	I would	I would
Thou wouldst	Thou shouldst	Thou wouldst
He would	He should	He would
We should	We would	We would
You would	You should	You would
They would.	They should.	They would.

"The first persons singular and plural in both tenses of the verbs N° 2 and 3 are necessarily the same, because the speaker and the party spoken of are one, and therefore N° 3 may be said to have no first person. The only apparent ambiguity lies between the second persons of N° 1 and 3; but the verbs are so essentially distinct in sense, that this is never perceived, even in writing; and in conversation it is always avoided by the emphasis laid on N° 3.

"An Englishman says to his friend 'I *shall* be very glad to see you,' not, like the Scotch and Irish, 'I *will* be very glad;' the simple futurity only is here proper to be expressed, for an effort of implied volition destroys the civility. It is no compliment to any one to say, 'I *will try* to be *glad* to see you,' and the expression itself is a solecism. Writers on experimental philosophy in Scotland often say, 'If we make such and such an experiment, we *will* find the result, &c.' though they mean simple futurity—that the result *will* be so. It is as ridiculous to say, 'we *will* (that is, we are determined to) find the result so,' as to say, 'the result *shall* be so;' or else to understand the verb N° 3 instead of N° 1, the result *will* (or is in its own mind determined to) be so.

"A true English writer is so much on his guard against the above error, that he sometimes falls into a contrary fault; for instance, in a note of civility written, as usual, in the third person:—'Mr. A. hoped to have sent Mr. B. the promised books this morning, but is disappointed. He trusts, however, that next week he *shall* have no difficulty in procuring them.' The true meaning of which is, 'he confidently thinks to himself, *I shall have no difficulty in procuring them.*' The writer could not so completely transform himself in idea into a third person, as to forget his own identity. If he had wanted to say 'he trusts that his bookseller *will* have no difficulty in procuring them,' the third person being evident, no doubt could have arisen in his mind." See farther, Athenæum, vol. ii. pa. 251.

SHALLO'ON. *s.* A slight woollen stuff (*Swift*).

SHA'LLOP. *s.* (*chaloupe*, Fr.) A small boat (*Raleigh*).

SHALLOT, in botany. See ALLIUM.

SHA'LLOW. *a.* 1. Not deep; having the bottom at no great distance from the surface or edge (*Bacon*). 2. Not intellectually deep; not profound; empty; trifling; futile; silly (*Addison*). 3. Not deep of sound (*Bacon*).

SHA'LLOW. *s.* A shelf; a sand; a flat; a shoal; a place where the water is not deep (*Bentley*).

SHA'LLOWBRAINED. *a.* (*shallow* and *brain.*) Foolish; futile; trifling; empty (*South*).

SHA'LLOWLY. *ad.* (from *shallow.*) 1. With no great depth (*Carew*). 2. Simply; foolishly (*Shakspeare*).

SHA'LLOWNESS. *s.* (from *shallow.*) 1. Want of depth. 2. Want of thought; want of understanding; futility; silliness; emptiness (*Herbert*).

SHALM. *s.* (Ger.) A kind of musical pipe, or horn; often spelt *shawm.*

SHALT. The second person of *shall.*

To SHAM. *v. n.* (*shommi*, Welsh, to cheat.) 1. To trick; to cheat; to fool by a fraud; to delude with false pretences (*Prior*). 2. To obtrude by fraud or folly (*L'Estrange*).

SHAM. *s.* (from the verb.) Fraud; trick; delusion: false pretence; imposture (*Locke*).

SHAM. *a.* False; counterfeit; fictitious; pretended (*Gay*).

SHAM. See DAMASCUS.

SHAMBLES, among miners, a sort of niches, or landing places, left at such distances in the adits of mines, that the shovelmen may conveniently throw up the ore from shamble to shamble, till it comes to the top of the mine.

SHA'MBLES. *s.* The place where butchers kill or sell their meat; a butchery (*Shakspeare*).

SHA'MBLING. *a.* Moving awkwardly and irregularly (*Smith*).

SHAME. *s.* (rceam, Sax. *schaemte*, Dut.) 1. The passion felt when reputation is supposed

to be lost (*Locke*). 2. The cause or reason of shame; disgrace; ighominy (*South*). 3. Reproach; infliction; shame (*Ecclus.*).

To SHAME. *v. a.* (from the noun.) 1. To make ashamed; to fill with shame (*Shakspeare*). 2. To disgrace (*Spenser*).

To SHAME. *v. n.* To be ashamed (*Raleigh*).

SHA'MEFACED. *a.* (*shame* and *face.*) Modest; bashful; easily put out of countenance (*Addison*).

SHAMEFA'CEDLY. *ad.* (from *shamefaced.*) Modestly; bashfully.

SHAMEFA'CEDNESS. *s.* (from *shamefaced.*) Modesty; bashfulness; timidity.

SHA'MEFUL. *a.* (*shame* and *full.*) 1. Disgraceful; ignominious; infamous; reproachful (*Milton*). 2. Full of indignity or indecency; raising shame in another (*Spenser*).

SHA'MEFULLY. *ad.* 1. Disgracefully; ignominiously; infamously; reproachfully (*South*). 2. With indignity; with indecency; so as ought to cause shame (*Spenser*).

SHA'MELESS. *a.* (from *shame.*) Wanting shame; wanting modesty; impudent; frontless; immodest; audacious (*South*).

SHA'MELESSLY. *ad.* Impudently; audaciously; without shame (*Hale*).

SHA'MELESSNESS. *s.* (from *shameless.*) Impudence; want of shame; immodesty.

SHA'MMER. *s.* (from *sham.*) A cheat; an impostor.

SHAMMY, or CHAMOIS LEATHER, a kind of leather, dressed either in oil or tanned; and much esteemed for its softness, pliancy, and being capable of bearing soap without hurt. The true shammy is prepared of the skin of the chamois-goat. See CAPRA.

The true chamois leather is counterfeited with common goat, kid, and even sheep-skin; the practice of which makes a particular profession, called by the French chamoisure. The last is the least esteemed, yet so popular, and such vast quantities prepared, especially about Orleans, Marseilles, and Thoulouse, that it may not be amiss to give the method of preparation.

The manner of chamoising, or of preparing sheep, goat, or kid-skins in oil, in imitation of chamois.—The skins being washed, drained, and smeared over with quick lime on the fleshy side, are folded in two, lengthwise, the wool outwards, and laid on heaps, and so left to ferment eight days; or, if they had been left to dry after flaying, for fifteen days. Then they are washed out, drained, and half-dried, laid on a wooden leg or horse, the wool stripped off with a round staff for the purpose, and laid in a weak pit, the lime whereof had been used before, and had lost the greatest part of its force. After twenty-four hours they are taken out, and left to drain twenty-four more; then put in another strong pit. This done, they are taken out, drained, and put in again by turns; which begins to dispose them to take oil: and this practice they continue for six weeks in summer, or three months in winter; at the end whereof they are washed out, laid on the wooden leg, and the surface of the skin on the wool side peeled off, to render them the softer; then, made into parcels, steeped a night in the river; in winter, more; stretched six or seven over one another, on the wooden leg; and the knife passed strongly on the flesh side, to take off any thing superfluous, and render the skin smooth. Then they are stretched as before, in the river, and the same operation repeated on the wool side; then thrown into a tub of water with bran in it, which is brewed among the skins till the greatest part stick to them; and then separated into distinct tubs, till they swell and rise of themselves above the water. By this means the remains of the lime are cleared out: they are then wrung out, hung up to dry on ropes, and sent to the mill, with the quantity of oil necessary to scour them: the best oil is that of stock-fish. Here they are first thrown in bundles into the river for twelve hours, then laid in the mill trough, and fulled without oil till they be well softened; then oiled with the hand, one by one, and thus formed into parcels of four skins each, which are milled and dried on chords a second time, then a third; then oiled again and dried.

This process is repeated as often as necessity requires; when done, if there be any moisture remaining, they are dried in a stove, and made up into parcels wrapped up in wool; after some time they are opened to the air, but wrapped up again as before, till such time as the oil seems to have lost all its force, which it ordinarily does in twenty-four hours.

The skins are then returned from the mill to the chamoiser to be scoured; which is done by putting them into a lixivium of wood-ashes, working and beating them in it with poles, and leaving them to steep till the lye have had its effect; then wrung out, steeped in another lixivium, wrung again, and this repeated till all the grease and oil be purged out. They are then half dried, and passed over a sharp-edged iron instrument, placed perpendicular in a block, which opens, softens, and makes them pliable: lastly, they are thoroughly dried, and passed over the same instrument again, which finishes the preparation, and leaves them in form of shammy.

Kid and goat skins are chamoised in the same manner as those of sheep, excepting that the hair is taken off without the use of any lime; and that when brought from the mill they undergo a particular preparation called ramalling, the most delicate and difficult of all the others. It consists in this, that as soon as brought from the mill they are steeped in a fit lixivium: taken out, stretched on a round wooden leg, and the hair scraped off with the knife; this makes them smooth, and, in working, cast a fine nap. The difficulty is in scraping them evenly. See farther the article LEATHER.

SHA'MROCK. *s.* The Irish name for three-leaved grass (*Spenser*).

SHANK. *s.* (rceanca, Sax. *schenckel*, Dut.) 1. The middle joint of the leg; that part

which reaches from the ankle to the knee. 2. The bone of the leg (*Shakspeare*). 3. The long part of any instrument (*Moxon*).

SHANK-BONE, in a horse, is the bone extending from the knee to the fetlock-joint. This bone should be uniform, firm and compact, well proportioned to the length of the fore-arm above, and the pastern below: if too long for either, or both, the symmetry is totally lost, and hence a general objection to horses whose legs are too long for the carcase, which is a defect readily observed; so that even indifferent judges are always prepared to say, such a horse has "too much day-light under him."

SHA'NKED. *a.* (from *shank*.) Having a shank.

SHANKER. See CHANCRE and SURGERY.

SHANNON, the largest river of Ireland, which issues from Lough Allen, in the county of Leitrim, and running S. divides the provinces of Leinster and Connaught; it then turns S.W. passes by the city of Limerick, and enters the Atlantic ocean, between the counties of Clare and Limerick.

SHANSCRIT, SAMSCRIT, SAMSCRETAM, or HANSCRIT language, is the original language of the Hindus, in which their Shastah, or Shaster, is written, &c.

This language is very copious and nervous; but the style of the best authors wonderfully concise. It far exceeds the Greek and Arabic in the variety of its etymology, and, like them, has a prodigious number of derivatives from each primary root. The grammatical rules are also numerous and difficult, though there are not many anomalies. It has seven declensions of nouns, which are all used in the singular, dual, and plural number, and differently formed, as they terminate with a consonant, and with a long or short vowel; and also as they are of different genders. The Shanscrit alphabet contains fifty letters; and it is one boast of the Bramins, that it exceeds all other alphabets in this respect. But when we consider that of their thirty-four consonants, nearly half are combined sounds, and that six of their vowels are merely the correspondent long ones to as many which are short, the advantage seems to be little more than imaginary. The Shanscrit character, used in Upper Hindustan, is said to be the same original letter that was first delivered to the people by Brihma, and is called Diewnagur, or the language of angels; whereas the character used by the Bramins of Bengal is by no means so ancient, and is evidently a corruption of the former. In the four beids, which constitute the original and sacred text of the great Hindu creator and legislator Brihma, the length of the vowels is expressed by a musical note or sign placed over every word; and in reading the beids, these distinctions of tone and time must be nicely observed; so that they produce all the effect of a laboured recitative. It is remarkable, that the Jews in their synagogues chant the Pentateuch in the same kind of melody, and it is supposed that this usage has descended to them from the remotest ages. Some writers have erroneously asserted, that the four beids are in verse; whereas they are written in a kind of measured prose; and they are now scarce intelligible to the most learned pundits or lawyers; they are also scarce, and difficult to be found. However, comments have been written upon them from the earliest periods; of which one of the most ancient and approved was composed by Bisesht Mahamomè, or the Most Wise, a great writer and prophet, who is said to have lived in the suttee jogue, or first age of the world. See Halhed's Preface to his translation of the Code of Gentoo Laws.

SHAP, a village in Westmorland, at the source of the Loder, between Orton and Penrith. It had once a famous abbey, which stood about a mile W. from the church, of which little remains, except the tower of its church, and the ruins of a bridge. In the vicinity are some great stones, like pyramids, placed almost in a direct line, for a mile together, from ten to twelve yards distance, of such immense weight, that carriages now in use could not support them.

To SHAPE. *v. a.* preterit *shaped;* part. pass. *shaped* and *shapen* (ꝧcyppan, Saxon; *scheppen*, Dutch.) 1. To form; to mould with respect to external dimensions (*Harvey*). 2. To mould; to cast; to regulate; to adjust (*Prior*). 3. To image; to conceive (*Shakspeare*). 4. To make; to create (*Psalms*).

SHAPE. *s.* (from the verb.) 1. Form; external appearance (*Shakspeare*). 2. Make of the trunk of the body (*Addison*). 3. Being, as moulded into form (*Milton*). 4. Idea; pattern (*Milton*).

SHA'PELESS. *a.* (from *shape*.) Wanting regularity of form; wanting symmetry of dimensions (*Donne*).

SHA'PELINESS. *s.* (from *shapely*.) Beauty or proportion of form.

SHA'PELY. *a.* (from *shape*.) Symmetrical; well formed.

SHA'PESMITH. *s.* (*shape* and *smith*.) One who undertakes to improve the form (*Garth*).

SHAPINSHA, one of the Orkney islands, lying three miles from the NE. part of Pomona. It is seven miles long and five broad, somewhat in the form of a cross. The coasts are level and produce grass and corn, but the middle part is high and fit only for sheep pasture.

SHARD. *s.* (*schaerde*, Frisic.) 1. A fragment of an earthen vessel (*Shakspeare*). It seems in *Spenser* to signify a frith or strait (*Fairy Queen*).

SHA'RDBORN. *a.* (*shard* and *born*.) Born or produced among broken stones or pots.

SHA'RDED. *a.* (from *shard*.) Inhabiting shards (*Shakspeare*).

To SHARE. *v. n.* (ꝧceapian, ꝧcynan, Sax.) 1. To divide; to part among many (*Swift*). 2. To partake with others (*Spenser*). 3. To cut; to separate; to sheer (*Dryden*).

To SHARE. *v. n.* To have part; to have a dividend (*Dryden*).

SHARE. *s.* (from the verb). 1. Part; allotment; dividend (*Temple*). 2. A part of the whole (*Brown*). 3. (rcear, Saxon.) The blade of the plough that cuts the ground. See PLOUGH.

SHA'REBONE. *s.* (*share* and *bone*.) The os pubis; the bone that divides the trunk from the limbs (*Derham*).

SHA'RER. *s.* (from *share*.) 1. One who divides, or apportions to others; a divider. 2. A partaker; one who participates any thing with others (*Daniel*).

SHARK. *s.* (*canis charcharias*, Latin.) 1. A voracious sea fish. See SQUALUS. 2. A greedy artful fellow; one who fills his pockets by sly tricks (*South*). 3. Trick; fraud; petty rapine (*South*).

To SHARK. *v. a.* To pick up hastily or slily (*Shakspeare*).

To SHARK. *v. n.* 1. To play the petty thief (*L'Estrange*). 2. To cheat; to trick (*South*).

SHARON, a name common to three cantons of Palestine. The first lay between mount Tabor and the sea of Tiberias; the second between the city of Cæsarea of Palestine, and Joppa; and the third lay beyond Jordan. To give an idea of perfect beauty, Isaiah said, the glory of Lebanon and the beauty of Carmel must be joined to the abundance of Sharon. (Isaiah xxxiii. 9. xxxi. 2.) The plains of Sharon are of vast extent.

SHARP. *a.* (rcearp, Saxon; *scherpe*, Dutch.) 1. Keen; piercing; having a keen edge; having an acute point; not blunt (*Moxon*). 2. Terminating in a point or edge; not obtuse (*More*). 3. Acute of mind; witty; ingenious; inventive (*Sidney*). 4. Quick, as of sight or hearing (*Davies*). 5. Sour without astringency; sour, but not austere; acid (*Dryd.*). 6. Shrill; piercing the ear with a quick noise; not flat (*Bacon*). 7. Severe; harsh; biting; sarcastic (*South*). 8. Severe; quick to punish, cruel; severely rigid (*Shakspeare*). 9. Eager; hungry; keen upon a quest (*Shakspeare*). 10. Painful; afflictive (*Tillotson*). 11. Fierce; ardent; fiery (*Dryden*). 12. Attentive; vigilant (*Swift*). 13. Acrid; biting; pinching; piercing, as the cold (*Ray*). 14. Subtle; nice; witty; acute (*Digby*). 15. (Among workmen.) Hard (*Moxon*). 16. Emaciated; lean (*Milton*).

SHARP. *s.* (from the adjective.) 1. A sharp or acute sound (*Shakspeare*). 2. A pointed weapon; small sword; rapier.

SHARP, in music. A character, the power of which is to raise the note before which it is placed half a tone higher than it would be without such a prefix.

SHARP KEY. See KEY.

SHARP (John), of the Little Horton family, near Bradford, Yorkshire, was educated at Christ college, Cambridge, and became chaplain to sir Heneage Finch, attorney-general. In 1672 he was archdeacon of Berks, and in 1675 prebendary of Norwich, and then rector of St. Bartholomew near the Exchange, and afterwards of St. Giles's in the fields. In 1681 he was made dean of Norwich, by the interest of Finch, then lord chancellor. In 1686 he was suspended, for preaching in favour of the Anglican church against popery: but though the bishop of London, who refused to pronounce against him, was himself suspended, the storm passed away, and he was, in 1689, made dean of Canterbury, and next succeeded to the see of York. He died at Bath, 1713. His sermons are in 7 vols. 8vo.

SHARP (Abraham), in biography, an eminent mathematician, mechanist, and astronomer, was descended from an ancient family at Little Horton, near Bradford, in the west riding of Yorkshire, where he was born about the year 1651. At a proper age he was put apprentice to a merchant at Manchester; but his genius led him so strongly to the study of mathematics, both theoretical and practical, that he soon became uneasy in that situation of life. By the mutual consent, therefore, of his master and himself, though not altogether with that of his father, he quitted the business of a merchant. Upon this he removed to Liverpool, where he gave himself up wholly to the study of mathematics, astronomy, &c. and where for a subsistence he opened a school, and taught writing and accounts, &c.

He had not been long at Liverpool, when he accidentally fell in company with a merchant, or tradesman, visiting that town from London, in whose house it seems the astronomer Flamsteed then lodged. With the view, therefore, of becoming acquainted with this eminent man, Mr. Sharp engaged himself with the merchant as a book-keeper. In consequence he soon contracted an intimate acquaintance and friendship with Mr. Flamsteed, by whose interest and recommendation he obtained a more profitable employment in the dock-yard at Chatham: where he continued till his friend and patron, knowing his great merit in astronomy and mechanics, called him to his assistance in contriving, adapting, and fitting up the astronomical apparatus in the royal observatory at Greenwich, which had been lately built, namely, about the year 1676; Mr. Flamsteed being then thirty years of age, and Mr. Sharp twenty-five.

In this situation he continued to assist Mr. Flamsteed in making observations (with the mural arch, of 80 inches radius, and 140 degrees on the limb, contrived and graduated by Mr. Sharp) on the meridional zenith distances of the fixed stars, sun, moon, and planets, with the times of their transits over the meridian; also the diameters of the sun and moon, and their eclipses, with those of Jupiter's satellites, the variation of the compass, &c. He assisted him also in making a catalogue of near 3000 fixed stars, as to their longitudes and magnitudes, their right ascensions and polar distances, with the variations of the same while they change their longitude by one degree.

But from the fatigue of continually observing the stars at night, in a cold thin air, joined to a weakly constitution, he was reduced to a

bad state of health; for the recovery of which he desired leave to retire to his house at Horton; where, as soon as he found himself on the recovery, he began to fit up an observatory of his own; having first made an elegant and curious engine for turning all kinds of work in wood or brass, with a maundril for turning irregular figures, as ovals, roses, wreathed pillars, &c. Beside these, he made himself most of the tools used by joiners, clockmakers, opticians, mathematical instrument-makers, &c. The limbs or arcs of his large equatorial instrument, sextant, quadrant, &c. he graduated with the nicest accuracy, by diagonal divisions into degrees and minutes. The telescopes he made use of were all of his own making, and the lenses ground, figured, and adjusted with his own hands.

It was at this time that he assisted Mr. Flamsteed in calculating most of the tables in the second volume of his Historia Cælestis, as appears by their letters, to be seen in the hands of Mr. Sharp's friends at Horton. Likewise the curious drawings of the charts of all the constellations visible in our hemisphere, with the still more excellent drawings of the planispheres both of the northern and southern constellations. And though these drawings of the constellations were sent to be engraved at Amsterdam by a masterly hand, yet the originals far exceeded the engravings in point of beauty and elegance: these were published by Mr. Flamsteed, and both copies may be seen at Horton.

The mathematician meets with something extraordinary in Sharp's elaborate treatise of Geometry Improved (in 4to. 1717, signed A. S. Philomath.), 1st, by a large and accurate table of segments of circles, its construction and various uses in the solution of several difficult problems, with compendious tables for finding a true proportional part; and their use in these or any other tables exemplified in making logarithms for their natural numbers, to 60 places of figures; there being a table of them for all primes to 1100, true to 61 figures. 2d, His concise treatise of Polyedra, or solid bodies of many bases, both the regular ones and others: to which are added twelve new ones, with various methods of forming them, and their exact dimensions in surds, or species, and in numbers: illustrated with a variety of copper-plates, neatly engraved by his own hands. Also the models of these polyedra he cut out in box wood with amazing neatness and accuracy. Indeed few or none of the mathematical instrument-makers could exceed him in exactly graduating or neatly engraving any mathematical or astronomical instrument, as may be seen in the equatorial instrument above mentioned, or in his sextant, quadrants and dials of various sorts; also in a curious armillary sphere, which, beside the common properties, has moveable circles, &c., for exhibiting and resolving all spherical triangles; also his double sector, with many other instruments, all contrived, graduated and finished, in a most elegant manner, by himself. In short, he possessed at once a remarkably clear head for contriving, and an extraordinary hand for executing any thing, not only in mechánics, but likewise in drawing, writing, and making the most exact and beautiful schemes or figures in all his calculations and geometrical constructions.

The quadrature of the circle was undertaken by him for his own private amusement in the year 1699, deduced from two different series, by which the truth of it was proved to 72 places of figures; as may be seen in the introduction to Sherwin's tables of logarithms; that is, if the diameter of a circle be 1, the circumference will be found equal to 3·14159265358979323846264338327950288419716939937510 58209749445923078164 05, &c. In the same book of Sherwin's may also be seen his ingenious improvements on the making of logarithms, and the constructing of the natural sines, tangents, and secants.

He also calculated the natural and logarithmic sines, tangents, and secants, to every second in the first minute of the quadrant: the laborious investigation of which may probably be seen in the archives of the Royal Society, as they were presented to Mr. Patrick Murdoch for that purpose; exhibiting his very neat and accurate manner of writing and arranging his figures, not to be equalled perhaps by the best penman now living.

Mr. Sharp kept up a correspondence by letters with most of the eminent mathematicians and astronomers of his time, as Mr. Flamsteed, Sir Isaac Newton, Dr. Halley, Dr. Wallis, Mr. Hodgson, Mr. Sherwin, &c. the answers to which letters are all written upon the backs, or empty spaces, of the letters he received, in a short-hand of his own contrivance. From a great variety of letters (of which a large chest full remain with his friends) from these and many other celebrated mathematicians, it is evident that Mr. Sharp spared neither pains nor time to promote real science. Indeed, being one of the most accurate and indefatigable computers that ever existed, he was for many years the common resource for Mr. Flamsteed, Sir Jonas Moore, Dr. Halley, and others, in all sorts of troublesome and delicate calculations.

Mr. Sharp continued all his life a bachelor, and spent his time as recluse as a hermit. He was of a middle stature, but very thin, being of a weakly constitution; he was remarkably feeble the last three or four years before he died, which was on the eighteenth of July, 1742, in the ninety-first year of his age.

In his retirement at Little Horton, he employed four or five rooms or apartments in his house for different purposes, into which none of his family could possibly enter at any time without his permission. He was seldom visited by any persons, except two gentlemen at Bradford, the one a mathematician, and the other an ingenious apothecary: these were admitted when he chose to be seen by them, by the signal of rubbing a stone against a certain part of the outside wall of the house. He duly attended the dissenting chapel at Bradford, of which he was a member, every Sunday. At these times he took care to be provided with plenty of half-

pence, which he very charitably suffered to be taken singly out of his hand, held behind him during his walk to the chapel, by a number of poor people who followed him, without his ever looking back, or asking a single question.

Mr. Sharp was very irregular as to his meals, and remarkably sparing in his diet, which he frequently took in the following manner: a little square hole, something like a window, made a communication between the room where he was usually employed in calculations, and another chamber or room in the house, where a servant could enter; and before this hole he had contrived a sliding board: the servant always placed his victuals in this hole, without speaking or making the least noise, and when he had a little leisure he visited his cupboard to see what it afforded to satisfy his hunger or thirst. But it often happened that the breakfast, dinner, and supper have remained untouched by him when the servant has gone to remove what was left, so deeply engaged had he been in calculations. Cavities might easily be perceived in an old English oak table where he sat to write, by the frequent rubbing and wearing of his elbows. *Gutta cavet lapidem*, &c. By Mr. Sharp's epitaph it appears that he was related to archbishop Sharp; and Mr. Sharp, the eminent surgeon, who some years since retired from business, is the nephew of our author. Another nephew was the father of the late Mr. Ramsden, the celebrated instrument-maker, who said that his grand uncle Abraham, our author, was some time, in his younger days, an exciseman, which occupation he quitted on coming to a patrimonial estate of about two hundred pounds a year.

For more particulars respecting this extraordinary man, see Dr. Hutton's Mathematical Dictionary, vol. ii.

SHARP (Thomas), D. D. younger son of Dr. John Sharp, was born in Yorkshire, and educated at Trinity college, Cambridge. His obtained the rectory of Rothbury, Northumberland, a prebend of Durham, and the archdeaconry of Northumberland, and died in 1758, aged 65. He is author of two dissertations on the etymology of the Hebrew words Elohim and Berith, 8vo.—besides discourses on the antiquity of the Hebrew tongue and characters, &c. He was father to Granville Sharp, known as an elegant classical scholar.

SHARPE (Gregory), D. D. F. R. A. S. S. of Yorkshire, 1713, came from Hull school to Westminster, and then went to Aberdeen. He was minister of Broadway chapel, St. James's, and chaplain to the king, and master of the Temple. He died 1771. He wrote a review of the controversy about the demoniacs of the new testament, 8vo.—two dissertations on the origin of language, and the power of letters, with a Hebrew lexicon, 8vo.—defence of Dr. Clarke against Leibnitz, 8vo.—dissertation on the origin and structure of the Latin tongue, 8vo. &c.

To SHARP. *v. a.* (from the noun.) To make keen (*Ben Jonson*).

To SHARP. *v. n.* To play thievish tricks (*L'Estrange*).

To SHA'RPEN. *v. a.* (from *sharp.*) 1. To make keen; to edge; to point (*Addison*). 2. To make quick; ingenious, or acute (*Ascham*). 3. To make quicker of sense (*Milton*). 4. To make eager or hungry (*Tillotson*). 5. To make fierce or angry (*Job*). 6. To make biting, sarcastic, or severe (*Smith*). 7. To make less flat; more piercing to the ears (*Bacon*). 8. To make sour.

SHA'RPER. *s.* (from *sharp.*) A tricking fellow; a petty thief; a rascal (*Pope*).

SHA'RPLY. *ad.* (from *sharp.*) 1. With keenness; with good edge or point. 2. Severely; rigorously; roughly (*Spenser*). 3. Keenly; acutely; vigorously (*Ben Jonson*). 4. Afflictively; painfully (*Hayward*). 5. With quickness (*Bacon*). 6. Judiciously; acutely; wittily.

SHA'RPNESS. *s.* (from *sharp.*) 1. Keenness of edge or point (*Dryden*). 2. Not obtuseness (*Wotton*). 3. Sourness without austereness (*Watts*). 4. Severity of language; satirical sarcasm (*Spratt*). 5. Painfulness; afflictiveness, (*South*). 6. Intellectual acuteness; ingenuity; wit (*Addison*). 7. Quickness of senses (*Hooker*).

SHARP-POINTED DOCK. See OXYLAPATHUM.

SHARP-SET. *a.* (*sharp* and *set.*) 1. Hungry; ravenous (*L'Estrange*). 2. Eager; vehemently desirous (*Sidney*).

SHARP-SIGHTED. *a.* (*sharp* and *sight.*) Having quick sight (*Davies. Clarendon*).

SHARP-VISAGED. *a.* (*sharp* and *visage.*) Having a sharp countenance (*Hale*).

SHASTER, or BEDANG, a sacred book, containing the religion of the Banians: it consists of three tracts; the first of which contains the moral law, the second the ceremonial, and the third delivers the peculiar observances for each tribe of Indians.—The shaster is looked upon by some as a commentary on the sedam, and by others as an original work, an extract of which has been lately published in England, and has thrown some light upon the subject. This book teaches, that the Eternal Being, absorbed in the contemplation of his own essence, formed the resolution of creating beings who might partake of his glory. He spoke, and angels rose into existence; they sang in concert the praises of their Creator, and harmony reigned in the celestial regions; when two of these spirits having revolted, drew a legion after them. The Supreme Being drove them into a place of torment, from whence they were released at the intercession of the faithful angels, upon conditions which at once inspired them with joy and terror. The rebels were sentenced, under different forms, to undergo punishments in the lowest of the 15 planets, in proportion to the enormity of their first offence; accordingly each angel underwent 87 transmigrations upon earth, before he animated the body of a cow, which holds the highest rank among the animal tribes. These different transmigrations

are considered as so many stages of expiation, preparatory to a state of probation, which commences as soon as the angel transmigrates from the body of the cow into a human body: in this situation the Creator enlarges his intellectual faculties, and constitutes him a free agent; and his good or bad conduct hastens or retards the time of his pardon. The good are at their death re-united to the Supreme Being, and the wicked begin anew the æra of their expiation. Those who desire more information on this subject may consult Dow's History of Indostan, and Holwell's Interesting Historical Events.

To SHA'TTER. *v. a.* (*schetteren*, Dutch.) 1. To break at once into many pieces; to break so as to scatter the parts (*Boyle*). 2. To dissipate; to make incapable of close and continued attention (*Norris*).

To SHA'TTER. *v. n.* To be broken, or to fall, by any force applied, into fragments (*Bac.*).

SHA'TTER. *s.* (from the verb.) One part of many into which any thing is broken at once (*Swift*).

SHA'TTERBRAINED. SHA'TTERPATED. *a.* (from *shatter*, *brain*, and *pate*.) Inattentive; not consistent.

SHA'TTERY. *a.* (from *shatter*.) Disunited; not compact; easily falling into many parts; loose of texture (*Woodward*).

To SHAVE. *v. a.* pret. *shaved*; part. *shaved* or *shaven*. (ꝩeapan, Saxon; *schaeven*, Dutch.) 1. To pare off with a razor (*Knolles*). 2. To pare close to the surface (*Milton*). 3. To skim by passing near, or slightly touching (*Milton*). 4. To cut in thin slices (*Bacon*). 5. To strip; to oppress by extortion; to pillage.

SHA'VELING. *s.* (from *shave*.) A man shaved; a friar, or religious (*Spenser*).

SHA'VER. *s.* (from *shave*.) 1. A man that practises the art of shaving. 2. A man closely attentive to his own interest (*Swift*). 3. A robber; a plunderer (*Knolles*).

SHA'VING. *s.* (from *shave*.) A thin slice pared off from any body (*Mortimer*).

SHAW. (ꝩcua, Saxon; *schawe*, Dutch.) A thicket; a small wood.

SHAW (Thomas), a learned English divine, was born at Kendal, in Westmoreland, about 1692, and educated first at the grammar school in that town, and next at Queen's college, Oxford, where he took his degrees in arts, and on entering into orders, was appointed chaplain to the factory at Algiers, where he remained several years. In his absence he was chosen fellow of his college, and at his return in 1733, took his degree of D. D. He published his Travels or Observations in several Parts of Barbary, and the Levant, at Oxford, in 1738, and in 1740 he was appointed principal of Edmund-hall. He died in 1751. His travels have been several times printed, and are deservedly in high estimation.

SHA'WFOWL. *s.* (*shaw* and *fowl*.) An artificial fowl made by fowlers on purpose to shoot at.

SHAWL, a square or rectangular handkerchief, made large enough to wear round the neck and over the shoulders. They are made sometimes of wool, sometimes of silk, and at others mixed. In many of those brought from India the wool is so fine and silky, that the whole handkerchief may be contained in the two hands closed. It is the produce of a Tibet sheep; but some say that no wool is employed but that of lambs torn from the belly of their mother before the time of birth. The most beautiful shawls came from Cashmire: their price is from 150 livres (about six guineas) to 1200 livres (or 50l. sterling). The shawls of British manufacture, it is said, can scarcely be distinguished from Indian shawls, though they can be afforded at one-twentieth part of the price.

SHAWM. See SHALM.

SHE, *pronoun*. In oblique cases *her*. (*si*, Gothic; ꝩeo, Saxon; *sche*, old English.) 1. The female pronoun demonstrative; the woman; the woman before mentioned (*Donne*). 2. It is sometimes used for a woman absolutely (*Shakspeare*). 3. The female, not the male (*Prior*).

SHEADING, a riding, tything, or division, in the Isle of Man; the whole island being divided into six sheadings; in every one of which there is a coroner or chief constable, appointed by the delivery of a rod at the annual convention.

SHEAF. *s. sheaves*, plural. (ꝩceaf, Saxon; *schoef*, Dutch.) 1. A bundle of stalks of corn bound together, that the ears may dry (*Fairfax*). 2. Any bundle or collection held together (*Locke*).

To SHEAL. *v. a.* To shell (*Shakspeare*).

To SHEAR. *v. a.* pret. *shore* or *sheared*; part. pass. *shorn*. (ꝩceapan, ꝩcyꝛen, Saxon. It is frequently written *sheer*, but improperly.) 1. To clip or cut by interception between two blades moving on a rivet (*Bacon*). 2. To cut by interception (*Grew*).

To SHEAR. *v. n.* (In navigation.) To make an indirect course.

SHEAR. SHEARS. *s.* (from the verb.) 1. An instrument to cut, consisting of two blades moving on a pin (*Shakspeare*). 2. the denomination of the age of sheep (*Mortimer*). 3. Any thing in the form of the blades of *shears*. 4. Wings, in *Spenser*.

SHEARBILL, in ornithology. See RHYNCHOPS NIGRA.

SHEARD. *s.* (ꝩceapꝺ, Saxon.) A fragment. Now commonly written *shard* (*Isaiah*).

SHEA'RER. *s.* (from *shear*.) One that clips with shears; particularly one that fleeces sheep (*Rogers*).

SHEA'RMAN. *s.* (*shear* and *man*.) He that shears (*Shakspeare*).

SHEATH. *s.* (ꝩcaꝺe, Saxon.) The case of any thing; the scabbard of a weapon (*Add.*).

To SHEATH. *To* SHEATHE. *v. a.* (from the noun.) 1. To enclose in a sheath or scabbard; to enclose in any case (*Boyle*). 2. (In philosophy.) To obtund any acrid particles (*Arbuthnot*). 3. To fit with a sheath (*Shak.*). 4. To defend the main body by an outward covering (*Raleigh*).

SHEATH, in botany. Vagina. A membrane investing a stem or branch; as in grasses.—Very different from SPATH, which see.

SHEATH-BILL, in ornithology. See VAGINALIS.

SHEATHED, in botany. Vaginatus. Invested by a sheath or cylindrical membranaceous tube, which is the base of the leaf; as the stem in polygonum amphibium, and the culm in grasses.

SHEATHING. Vaginans. When a leaf invests the stem or branch by its base in form of a tube; as in polygonum, rumex. Cistus incanus.—Applied also to the petiole and stipule.

SHEATHING, in the sea language, is the casing that part of a ship which is to be under water with fir-board of an inch thick; first laying hair and tar mixed together under the boards, and then nailing them on, in order to prevent worms from eating the ship's bottom. Ships of war are now generally sheathed with copper; but copper sheathing is liable to be corroded by the action of sea water.

SHEATHWI'NGED. *a.* (*sheath* and *wing*.) Having hard cases which are folded over the wings (*Brown*).

SHEA'THY. *a.* (from *sheath*.) Forming a sheath (*Brown*).

SHEBBEARE (John), an English physician, and political writer, was born at Bideford, in Devonshire, 1709, and received his education at the grammar-school of that town, under the learned Mr. Zachary Mudge, after which he was apprenticed to an apothecary. He carried on business in Bideford for some time, and then removed to Bristol, where he became a chemist, but about 1740 he removed to London, and commenced political writer. Being greatly attached to the Stuart family, he went to Paris on a visit to the pretender, and while there took his degree of M. D. and was admitted a member of the academy of sciences. On his return to England he published a political novel called the Marriage Act, which had like to have brought him into trouble. He went on writing with great bitterness against the ministry, and the reigning family, till 1759, when he was arrested and prosecuted for a seventh letter to the people of England. For this performance he was sentenced to be pilloried, and to a confinement of two years. On the accession of his present majesty, Shebbeare obtained a pension of 200*l.* per annum, and from that time he exercised his pen on the side of government. He died in 1788. The best of his works are Letters on the English Nation, under the name of Battista Angeloni, 2 vols. 8vo. and Chrysal, or the Adventures of a Guinea, in 4 vols. 12mo.

SHE'CKLATION. *s.* Gilded leather (*Spenser*).

To SHED. *v. a.* (rceban, Saxon.) 1. To effuse; to pour out; to spill (*Davies*). 2. To scatter; to let fall (*Prior*).

To SHED. *v. n.* To let fall its parts (*Mortimer*).

SHED. *s.* 1. A slight temporary covering (*Sandys*). 2. In composition, effusion; as, blood-*shed*.

SHE'DDER. *s.* (from *shed*.) A spiller; one who sheds (*Ezekiel*).

SHEEN. SHEE'NY. *a.* Bright; glittering; showy: not in use (*Fairfax*).

SHEEN. *s.* (from the adjective.) Brightness; splendour: not used (*Milton*).

SHEEP. *s.* plural likewise *sheep*. (rceap, Sax. plural reep; *schaep*, Dutch.) 1. The animal that bears wool, remarkable for its usefulness and innocence (*Locke*). 2. A foolish silly fellow (*Ainsworth*).

SHEEP, in zoology. See OVIS.

SHEEP (Peruvian). See CAMELUS.

SHEEP (Composition for marking). For this purpose Dr. Lewis recommends tallow mixed with a certain proportion of tar, and the mixture thickened by powder of charcoal. The proportions he tried were an eighth, a sixth, and a fourth part of tar. None of these could be discharged by any washing or rubbing with water, but all of them completely by soap; that which had the smallest proportion, easily enough; the others more difficultly.

To SHEE'PBITE. *v. n.* (*sheep* and *bite*.) To use petty thefts (*Shakspeare*).

SHEE'PBITER. *s.* (from *sheepbite*.) A petty thief (*Tusser*).

SHEE'PCOT. *s.* (*sheep* and *cot*.) A little enclosure for sheep (*Milton*).

SHEE'PFOLD. *s.* (*sheep* and *fold*.) The place where sheep are enclosed (*Prior*).

SHEE'PHOOK. *s.* (*sheep* and *hook*.) A hook fastened to a pole, by which shepherds lay hold on the legs of their sheep (*Dryden*).

SHEE'PISH. *a.* (from *sheep*.) Bashful; over-modest; timorously and meanly diffident (*Locke*).

SHEE'PISHNESS. *s.* Bashfulness; mean and timorous diffidence (*Herbert*).

SHEE'PMASTER. *s.* (*sheep* and *master*.) A feeder of sheep (*Bacon*).

SHEEP'S EYE. *s.* (*sheep* and *eye*.) A modest diffident look, such as lovers cast at their mistresses (*Dryden*).

SHEEPSHEA'RING. *s.* (*sheep* and *shear*.) The time of shearing sheep; the feast made when sheep are shorn (*South*).

SHEE'PWALK. *s.* (*sheep* and *walk*.) Pasture for sheep (*Milton*).

SHEER. *a.* (rcyn, Sax.) Pure; clear; unmingled (*Atterbury*).

SHEER. *ad.* (from the adjective.) Clean; quick; at once (*Milton*).

To SHEER. *v. a.* See SHEAR (*Dryden*).

To SHEER *off*. *v. n.* To steal away; to slip off clandestinely.

SHEERNESS, a maritime town in Kent, on the N. point of the isle of Shepey, at the mouth of the Medway, three miles N. of Queenborough. A fort was built here by Charles II. after the insult of the Dutch, who burnt the men of war at Chatham, in 1667; and it has since been considerably augmented and improved. The buildings belonging to

it, in which the officers lodge, make a little neat town, and there is also a yard, a dock, and a chapel. Lon. 0. 48 E. Lat. 51. 28 N.

SHEERS, the name of an engine used to hoist, or displace the lowest masts of a ship. In the navy they are composed of several long masts, whose heels rest on the side of the hulk, and having their heads declining outward from the perpendicular, so as to hang over the vessel whose masts are to be fixed or displaced. The tackles, which extend from the head of the mast to the sheer-heads, are intended to pull in the latter toward the mast-head, particularly when they are charged with the weight of a mast after it is raised out of any ship, which is performed by strong tackles depending from the sheer-heads. The effort of these tackles is produced by two capsterns, fixed on the deck for this purpose. For merchant-ships, this machine is composed of two masts, or props, erected in the same vessel in which the mast is to be planted, or from whence it is to be removed. The lower ends of these props rest on the opposite sides of the deck.

SHEET. *s.* (sceat, Saxon.) 1. A broad and large piece of linen (*Acts*). 2. The linen of a bed (*Dryden*). 3. (*echoten*, Dutch.) *Sheets* in a ship are ropes bent to the clews of the sails, which serve in all the lower sails to hale or round off the clew of the sails; but in top-sails they draw the sail close to the yard-arms. 4. As much paper as is made in any one body (*Newton*). 5. A single complication or fold of paper in a book. 6. Any thing expanded (*Dryden*). 7. *Sheets*, in the plural, is taken for a book (*Waterland*).

SHEET-ANCHOR. *s.* (*sheet* and *anchor*.) In a ship, is the largest anchor; which, in stress of weather, is the mariners last refuge, when an extraordinary stiff gale of wind happens.

To SHEET. *v. a.* (from the noun.) 1. To furnish with sheets. 2. To enfold in a sheet. 3. To cover as with a sheet (*Shakspeare*).

SHEFFIELD, a large and populous town, finely situated in the W. riding of Yorkshire, with a market on Tuesday. It has been long celebrated for its various hardware manufactures, which consist particularly of cutlery ware, plated goods, and buttons. Here are also lead works and a silk mill. It is seated on the Don, which is navigable within two or three miles of the town, and its neighbourhood abounds with coal. It has two large churches, and a spacious market-place, furnished with neat shops for butchers, &c. In 1801 the inhabitants were 31,314: now they amount to more than 34,000. It is 54 miles S.S.W. of York, and 161 N.N.W. of London. Lon. 1. 29 W. Lat. 53. 20 N.

SHEFFIELD (John), duke of Buckingham, a poet and statesman, born 1650. After travelling into France, he went as volunteer in the second Dutch war, and afterwards made a campaign in the French service. He was next entrusted with the defence of Tangier, which was threatened by the Moors. He soon became a favourite at court, though his partiality for Anne, afterwards queen, involved him in temporary disgrace. Under James II. he was privy counsellor, and lord chamberlain; and though he did not at first approve of the revolution, he afterwards supported the measures for proclaiming William king, against those who wished to appoint Mary sole sovereign. Under Anne, he was raised to the rank of duke of Normanby, and afterwards of Buckinghamshire, and was made steward of the household, and president of the council. On George's accession, he retired from the court, and died 1721. He was buried in Westminster abbey, where the Latin inscription on his monument, written by himself, created some controversy, and drew upon him the reproach of scepticism. His works were elegantly published in 1729, in 2 vols. 8vo. the first of which contains his essay on poetry, his rehearsal, and other poems, written on several occasions, and the second his prose works, consisting of essays, speeches, historical memoirs, dialogues, letters, &c. His learning and abilities have been greatly praised by his contemporaries; but later writers affect to speak with indifference of his compositions, and consider the adulation of Prior, Dryden, Addison, Pope, &c. as paid more to the nobleman than to the man of splendid genius.

SHEFFIELDIA, in botany, a genus of the class pentandria, order monogynia. Calyx five-cleft; corol campanulate; filaments ten, every other one abortive; capsule one-celled, five-valved, many-seeded. One species only, a small creeping plant of New Zealand, resembling peplis portula.

SHEFFORD, a town in Bedfordshire, with a market on Friday, seated between two rivulets, which unite their streams below the town, and fall into the Ouse. It is eight miles S.E. of Bedford, and 41 N. by W. of London. Lon. 0. 21 W. Lat. 52. 8 N.

SHEFNAL, a town in Shropshire, with a market on Friday, nine miles N.E. of Bridgenorth, and 136 N.W. of London. Lon. 9. 22 W. Lat. 52. 42 N.

SHEIK, in the oriental customs, the person who has the care of the mosques in Egypt: his duty is the same as that of the imams at Constantinople. There are more or fewer of these to every mosque, according to its size or revenue. One of these is head over the rest, and answers to a parish-priest with us; and has under him, in large mosques, the readers, and people who cry out to go to prayers; but in small mosques the sheik is obliged to do all this himself. In such it is their business to open the mosque, to cry to prayers, and to begin their short devotions at the head of the congregation.

SHEKEL, the name of a weight and coin current among the ancient Jews. Dr. Arbuthnot makes the weight of the shekel equal to 9 pennyweights 2¼ grains Troy weight; and the value equal to 2*s.* 3⅜*d.* sterling. The golden shekel was worth 1*l.* 16*s.* 6*d.*

SHEKINAH, a rabbinical term, by which

is understood a visible symbol of the divine presence, which rested over the propitiatory or mercy seat, the covering of the ark, in the shape of a cloud. It was from this that God gave forth his oracles in an articulate and audible voice, when consulted by the high priest; hence it is said in Scripture, that God dwelleth between the cherubim, Psal. lxxx. 1. that he sitteth between the cherubim, Psal. xcix. 1. The rabbin tell us, that the shekinah first resided in the tabernacle, erected by Moses in the wilderness, descending on the day of its consecration in the figure of a cloud; and that it passed thence into the sanctuary of Solomon's temple, on the day of its dedication by that prince; where it continued down to the destruction of Jerusalem and of the temple by the Chaldeans.

SHELBURNE, a town of Nova Scotia, situate at Port Roseway. It extends two miles on the water side, and one mile backward, with wide streets crossing each other at right angles. The harbour is deep, capacious, and secure. About a mile from Shelburne, and separated from it by a small river, is the Black Town, containing about 1200 free blacks, who served on the royal side during the American war. Shelburne is 100 miles S.W. of Halifax. Lon. 65. 0 W. Lat. 43. 46 N.

SHELDRAKE, in ornithology. See ANAS.

SHELF. *s.* (cylf, Saxon; *scelf*, Dutch.) 1. A board fixed against a supporter, so that any thing may be placed upon it (*Swift*). 2. A sand bank in the sea; a rock under shallow water (*Boyle*). 3. The plural is analogically *shelves*; *Dryden* has *shelfs*, probably by negligence.

SHE'LFY. *a.* (from *shelf.*) Full of hidden rocks or banks; full of dangerous shallows (*Dryden*).

SHELL. *s.* (rcyll, rceall, Saxon; *schale*, *schelle*, Dutch.) 1. The hard covering of any thing; the external crust (*Locke*). 2. The covering of a testaceous or crustaceous animal. See SHELL-WORMS. 3. The covering of the seeds of siliquous plants (*Arbuthnot*). 4. The covering of kernels (*Donne*). 5. The covering of an egg (*Shakspeare*). 6. The outer part of a house (*Addison*). 7. It is used for a musical instrument in poetry (*Dryden*). 8. The superficial part (*Ayliffe*).

To SHELL. *v. a.* (from the noun.) To take out of the shell; to strip of the shell.

To SHELL. *v. n.* 1. To fall off as broken shells (*Wiseman*). 2. To cast the shell.

SHE'LLDUCK. *s.* A kind of wild duck (*Mortimer*).

SHE'LLFISH. *s.* (*shell* and *fish.*) Fish invested with a hard covering; either testaceous, as oysters; or crustaceous, as lobsters (*Woodward*).

SHE'LLY. *a.* (from *shell.*) 1. Abounding with shells (*Prior*). 2. Consisting of shells (*Bentley*).

SHELLS, in gunnery, are hollow iron balls to throw out of mortars or howitzers, with a fuze-hole of about an inch diameter, to load them with powder, and to receive the fuze: the bottom, or part opposite the fuze, is made heavier than the rest, that the fuze may fall uppermost; but in small elevations this is not always the case, nor is it necessary; for let it fall as it will, the fuze sets fire to the powder within, which bursts the shell, and causes great devastation. The shells had much better be made of an equal thickness, for then they burst into more pieces.

SHELLS (Message), are nothing more than howitz shells, in the inside of which a letter, or other papers, are put. The fuze-hole is stopped up with wood or cork, and the shells are fired out of a royal or howitz, either into a garrison or camp. It is supposed that the person to whom the letter is sent knows the time, and accordingly appoints a guard to look out for its arrival.

To find the weight of an iron shell.—Take nine sixty-fourths of the difference of the cubes of the external and internal diameters, and it will give the weight of the shell in pounds.

SHELL-WORMS, in natural history, *testacea*; a particular order of worms surrounded by a testaceous tunic which affords the double purpose of offence and defence. In chemical analysis the term shell has often been used, and is indeed generally used in a more extensive signification, as importing equally the external covering of crustaceous worms and insects, and the calcareous tunic of birds-eggs. And in this more extensive view we have touched upon it in examining the chemical properties of animal shells in the article CONCHOLOGY. In the present sketch, therefore, we shall confine ourselves to the strict meaning of the term as it occurs in the Linnéan system.

The class of worms was formerly confounded with insects and plants, the two first orders of intestinal and molluscous or soft-bodied being referred to the former, and the order of zoophytes to the latter; and some authors had even classed the testacea or shell-worms as a branch of mineralogy, regardless of the animal that inhabited the shells. According to the Linnéan system the class of worms consists of five orders, intestinal, molluscous, testaceous, zoophytic, and infusory: for all which see the articles VERMES, and ZOOLOGY. Our present concern is with the third of the orders, the testaceous worms alone: and this order is subdivided into three sections according to the number of valves or component parts of which the total shell consists, as multivalves, in which the component parts are more than two, bivalves, in which they are two alone, and univalves, in which there is only a single part or valve.

This division into univalves, bivalves, and multivalves is so clearly pointed out by nature, that it must be adopted in every well methodized arrangement, and may therefore be safely admitted in these preliminary observations. Univalve shells are discoidal when the spiral is formed on a horizontal line, so that a section, made in that line, would divide the shell into two nearly equal parts; fusiform when it bulges in the middle, and has the two extremities of nearly equal length; turbinated, when the belly of the shell is very large and tumid compared with the spire, which is given off from its centre; and turriculated when the turns of the spire, gradually increasing, form an elongated cone.

The parts of univalve shells are, the back, which is the external bulging part of the turn opposite to the opening; the belly, the tumid part of the last turn, forming the right or outer lip; that being termed the left which is formed on the columella, and which Linnéus distinguished as the columellar ridge. The spire is formed on the superior part of the shell, the turns of which are formed round the columella, or little central column, reaching from the opening of the shell to the summit of the spire. These convolutions are numbered by reckoning that as one, which reaches from the external to the inner lip, and in the same manner to the summit; the line by which they are united being termed a suture. The spire itself is either pointed, obtuse, truncated, flattened, concave, convex, straight, oblique, or pyramidal. Its turnings are coronated, (beset with spines or tubercles), beaded, carinated, or canaliculated. The suture is crenulated, double, projecting, or effaced. The shell is said to be perforated, when a small umbilical cavity exists in the columella at the base of the shell, in the axis round which the spire is revolved; and imperforate when there is here no cavity nor umbilicus. Besides being either umbilicated or not, the columella may be flattened, truncated, caudated, canaliculated, spiral, and plaited, as in the volutes. The umbilicus also may be slit, canaliculated, consolidated, crenulated, or dentated: it may also have a superadded cullus. The opening varies much in different shells; and where it narrows it acquires the name of throat; it terminates in a canal. The lip is eared, digitated, alated, grooved, slit, or wrinkled; the form of the opening depending much on that of the lip; it hence becoming angular, round, semicircular, longitudinal, transverse, linear, gaping, compressed, or reversed. The openings of shells are sometimes closed by a shelly or cartilaginous plano-convex body, termed operculum, which is disposed between the two lips, and fitted to the form of the opening. The flat surface of this body is marked by a spiral line.

A bivalve shell has the two valves, which constitute it, connected at the basis, or inferior margin; opposite to which is the superior margin; the shell being supposed to be placed on the hinge, its margin is divided into the anterior and the posterior margin. The length of the shell is measured from the inferior to the superior margin, and the breadth from the anterior to the posterior margin. The belly is the most tumid part, and the beaks, the prominences over the hinge, are of a conoidal and spiral form. At the basis of the shell is the hinge, by which the valves are moved on each other; and in the anterior chink a ligament is placed, by which the valves are closely connected. This chink is formed by a slight separation of the valves at this, the anterior, part, which having a distinct surface from the general disc, and being indeed separated from it by an angle, or by a raised or sunk line, it may be distinguished as the corslet: this surface is particularly distinguished in the shells of the Venus kind. On these parts, in some species, are spines, in others various markings, and in others, these parts are plain. At the lower part of the anterior margin of the valves, within the limits of the corslet, and above the ligament, is a part generally distinguishable from the rest of the surface by a difference in the colour, striæ, &c. This part varies in its form, being canaliculated, replicated, &c. Its edges are termed lips.

On the other side of the hinge, on the posterior part, and near to the hinge, is generally a lunated depression; the crescent, like the part just described, it varies in its form and markings in different shells. Both these parts derive half their form from each of the valves; and are consequently separated in the middle. To determine the side to which a valve belongs, the shell need only be placed on the hinge with the anterior side forward, when it directly shows itself.

In some irregular shells, as of oysters and spondyles, the shells are divided into upper and under, the upper shell being flatter than the under. In the terebratulæ, the upper shell, the beak of which is pierced, is more tumid than the under: but in most shells, as in the pectens, and the oysters, the upper valve is almost always the least tumid.

The hinge is, in general, furnished with teeth; but sometimes it is without. When placed on the side, they are said to be lateral; and when on the inferior extremity, terminal. The central teeth, essential to the genus, are termed the cardinal teeth; and the others, accessory or secondary. The teeth are in some shells articulated, in a cavity, in the opposite valve; in others, they are not. In multivalves also the shell is the combination of all the valves, whether connected by articulation, or by ligaments.

From the observations and experiments of Reaumur, which have been since considerably extended by Bruguière and others, the formation and growth of shells have obtained considerable illustration. Leuwenhoeck, Swammerdam, Lister, and others, had observed, that, at the first escape of the animal from the egg, it was invested by a complete spiral turn, at least, of the shell; and, it appears, from the observations of Adanson, that viviparous shell fish are likewise brought forth in a similar state. The growth of shells was discovered by Reaumur to take place in that which is most distant from the first formed part. Here a part of the animal exists which is not yet covered with shell; but which is beset with a vast number of vessels, which separate and deposit, on the existing edge of the shell, those glutinous and calcareous matters, by which its due increased extent of surface is obtained. In proof of this being the process by which the augmentation of the shell is effected, he broke the shells of various living testaceous animals in different parts, and was thus enabled to perceive, that the newly added matter was not deposited line after line from the shell, at the edges of the fractured part; but was separated, in a pellicle, from the body of the animal, and thus applied at once to the whole of the vacuity. Those, who denied this mode of increase, denied also the removal of the posterior termination of the worm, from the extreme termination of the first formed spire. But it is certain that the animal, in many shells, have their posterior termination attached to the point of the shell only in their earliest stages; and that, when older, it is found adherent to the second or third turn: and it has also been ascertained that the tail of the nerite is attached beneath the left or columellar lip. In proof of these animals possessing this power of removing themselves from these turns of the shell, or indeed from those parts in which their residence is no longer necessary, the circumstance may be adduced of the animal belonging to the porcellanea, sometimes abandoning its old shell, and forming a new one.

The various tints of different colours with which shells are so beautifully adorned, result, according to the remarks of the same ingenio naturalist,

from an œconomy and organization somewhat similar to that which has been just mentioned. On the neck of the animal, that part from which the matter of the shell is supposed to be secreted, the colours of the shell may be detected. Thus, if the ground of the shell be yellow, and it be marked with dark brown or black bands, then the neck of the animal will be seen of a white inclining to a yellow hue, with dark spots, answering in their number and direction to the bands observable in the shell itself: the colouring matter appearing to be here disposed, ready for its deposition, with the other substances of the shell. In this manner, and on these principles, has Reaumur been able to explain almost every circumstance, respecting the varieties of form and of colour which are observable in these bodies.

But a circumstance is observable in the olives and the porcellaneæ, to which Reaumur has not attempted to apply his doctrine. In these shells the colours are disposed in two layers, the outer of which is the production of an organization different from that of any of the other inhabitants of shells, and from which proceeds an operation, also different from what occurs in any other instance. At the period at which Reaumur wrote, several of the olives and of the cowries, in consequence of certain differences of colour, and of some difference also in their forms, were considered as of different species from others, of which they were in fact individuals of the same species; but had not yet acquired their perfect state. For want of reckoning upon this circumstance, the celebrated Linnéus has unnecessarily multiplied the number of species of these shells.

The highly ornamented surface of these shells is formed at two different periods, and by two different processes. The first appears to be that deposition which takes place from the surface of the body of the animal; and in which but little takes place different from what occurs in shells in general. But as the age of the animal advances, this surface is covered by another; the primitive colours disappear, others are disposed over them, and the substance itself of the shell becomes considerably thickened. This process is performed by a simple, but most curious organization. Two soft, membraneous flaps, or winged processes, pass out of the opening of the shell, turn back on the external convex surface, and cover it so completely as not to leave the least portion to be seen at the line where they meet each other, on the back of the shell. From the superior surface of these membraneous bodies, that surface, which clings to the convex part of the shell, exudes that secretion by which the shell is increased in bulk; and a new arrangement of the beautiful colours of its drapery is effected.

Bruguière ascertained this formation of a second surface by actual observation at Madagascar; and the fact derives additional proof from the pale line which passes frequently along the back of these shells, marking the part where the edges of the membraneous wings met. Still more positive proof is rendered by rubbing down the second coat, when the markings of the first coat will make their appearance.

Although the colours are thus disposed by the animal, the action of light appears to have a considerable effect in augmenting their brilliancy; climate also occasions considerable differences in this respect; hence the shells obtained from the torrid zones are much more rich in their colouring than those which are found in the more temperate zones. But notwithstanding the circumstance just noticed, there is great reason for attributing the high degree of colouring in shells more to the effects of light than to the heat of the climate.

It is not the colouring only of the second coat of the porcellaneous shells which is given by this second operation, the several asperities observable in various shells, as in the Cypræa tuberculosa, and in the Cypræa pediculus, are superadded at the same period.

The form of the shell will necessarily depend on that with which the worm is first invested; but it is a curious subject of investigation, on what peculiar modification of the animal depends the spiral form of univalve shells. This has been attempted to be explained, by Reaumur, by a very simple peculiarity of organization: it being sufficient, he supposes, to consider the fibres on one surface of the body to be shorter than those on the opposite surface. From this inherent peculiarity of formation, the prolongation of the animal must necessarily be in a spiral form: and, from the various obliquities of disposition of these shorter and longer fibres, will proceed that variety of direction in which the spiral turns will be disposed.

The umbilicus, the cavity in the centre of the spire, which is seen in the lower part of the shell, depends on the direction in which the animal has extended the shell. Thus, if the turns of the spire have been carried round an axis of a conical form, each turn having departed more and more from the centre of the shell, an umbilicus will be formed, more or less open, as the turns depart more or less from the centre. But if the turns are made round an axis so straight and fine as to occasion the turns to touch each other, then no umbilical cavity will be formed at the bottom of the shell.

To enable us to account for the longitudinal, raised, and thickened ribs which cross in a longitudinal direction, the turns of the spire, and which are termed varices by Linnéus, it is necessary to refer to the formation of the opening of land shells, when they have obtained their full growth. At this period the lip of the shell, from the frequent egress and return of the animal through the opening, has an additional portion of the testaceous matter repeatedly deposited upon it, by which it acquires a bordered edge, which differs in size and thickness in the shells of different animals. But in sea shells, the growth of the shell is not completed on the formation of this bordered lip; the continuation of the spire still proceeding after its formation. To explain the formation of these ribbed longitudinal projections, it is therefore only necessary to suppose the animal, after having formed the bordered edge to the mouth of the shell, to have proceeded uninterruptedly for a certain period in the formation of the common smooth surface of the shell, which, as it would then extend beyond the lately formed lip, would now render it a rib projecting from the general surface; and by a repetition of this process, a succession of these ribs, with intermediate spaces of the common surface, such as frequently exists in turbinated shells, would consequently be formed.

From a process exceedingly similar we may suppose the formation of the warted protuberances and tubercles to have proceeded; corresponding fleshy projections, existing on that part of the surface of the animal to which this part of the shell has been applied, having been the moulds, as it were, on which these have been formed. Whilst these fleshy protuberances have continued, these processes have remained hollow; but where the

fleshy protuberances have been diminished, these processes have become partly filled up; and where they have been removed, these have become entirely solid, from the deposition of additional shelly matter from the surface of the animal, the existence of the cavities being necessary no longer than the continuance of the fleshy processes themselves.

The production of the spinous processes so frequent on many shells approaches still nearer to that of the ribbed protuberances, since they have been formed by little, long, tongue-like processes, with which the neck of the animal is beset, and which have served in the same manner to produce these spines as the neck of the animal has served to form the bordered edge of the shell, by an addition of the testaceous matter at each time the neck of the animal, at certain periods, passed out or returned into the shell. The confirmation of this being the mode of their formation is yielded by the circumstance of these spines being ranged in lines, at equal distances, on the ribbed protuberances, or varices of Linnéus, the formation of which has not only been similar, but simultaneous.

The production of the channel, or gutter, the cauda of Linnéus, depends on circumstances extremely similar to those on which has depended the formation of the various parts already noticed. All those animals whose shells have this termination are endued with an organ of a cylindrical form, capable of being contracted and extended, so as to allow the animal to explore its path, or to attach itself to neighbouring bodies. By the frequent employment of this organ, and by its necessarily accompanying, frequent, alternate contractions and extensions, its surface, which possesses the property of exuding a testaceous substance, must at each passage and return contribute to the formation of this canal, which would serve the purpose of a sheath to it.

By an ingenious application of these principles of Reaumur, Bruguiere and Brogniart (Bulletin de la Societe Philomatheque, No. 25) have very satisfactorily explained the production of the several fissures, striæ, grooves, and other modifications of the forms and surfaces of different shells. The author last mentioned has shown, that, in some instances, the organ by which some changes have been produced in the later formed part of the shell was not acquired by the animal until it had obtained its full size. By an application of these principles to bivalves, and even to multivalves, their peculiarities of form have also been very ingeniously accounted for. It has been found, that, in bivalves, the part of the animal which is termed the mantle is the organ on which the peculiarity of the form of each chiefly depends; it answering in this respect to the collar, or neck of the animal, belonging to univalve shells.

It does not seem necessary here to dwell on the labours of those who, previous to the time of Linnéus, had endeavoured to dispose of shells under the most comprehensive and distinctive arrangement. Whatever had been done before with this view gave way to the more lucid and correct disposition which Linnéus adopted; but this is certainly by no means the *ne plus ultra:* other divisions appear in some instances deserving of adoption, and new genera require to be admitted. It is therefore intended to give here Linnéus's arrangement of the genera, omitting the species; afterwards to give that which has been adopted by Du Bosc, agreeable to the discoveries and observations of Lamarck, Bruguiere, and others; and to offer a few explanatory remarks, for the purpose of showing the propriety or impropriety of the deviations from the arrangement of Linnéus.

Multivalve Shells.

Genus 1. Chiton. The animal covered by several shells lying on each other along the back.

2. Lepas. The shell, which is formed of several unequal and erect valves, is affixed by its base.

3. Pholas. Shell bivalve and divaricated, with smaller, accessory, differently formed pieces at the hinge.

Bivalves, or Conchs.

4. Mya. Gaper. Shell generally gaping at one end; the hinge with, for the most part, a thick, solid, spreading tooth, not inserted in the opposite valve.

5. Solen. Razor-shell. Shell oblong, gaping at both ends; hinge with a subulated reflexed tooth, often double, not inserted in the opposite valve: the lateral margin rather obsolete.

6. Tellina. The foreside of the shell sloping downwards; the hinge, in general, with three teeth; the side teeth, in one of the valves, being either flat or wanting.

7. Cardium. Shell with equal and nearly equilateral valves, longitudinally ribbed, or sulcated, the margin dentated; the hinge having, in the middle, two alternating teeth, one commonly incurved, and two lateral, remote teeth, inserted into each other.

8. Mactra. Shell with equal, but inequilateral valves; the hinge a complicated, central tooth, with an adjoining pit, and remote lateral teeth, inserted in the opposite valves.

9. Donax. The anterior margin of the shell very obtuse, the margin often crenulated; two teeth at the hinge, and on the hinder margin, a single one (rarely two, or three, or none) somewhat remote.

10. Venus. The lips lying over the anterior margin; the hinge with three teeth close together, the lateral ones diverging from the apex.

11. Spondylus. With rigid, unequal valves; the hinge being formed by two recurved teeth, with a cavity between.

12. Chama. The shell heavy; the hinge a gibbous projection, inserted in an oblique cavity; the fore parts closed without cartilages.

13. Arca. Equivalved; the hinge with numerous, acute, and alternately inserted teeth.

14. Ostrea. With unequal valves, sometimes eared; the hinge an ovate cavity, without teeth; but, in general, with lateral, transverse striæ; no space or depression at the ligament.

15. Anomia. The valves unequal, one flattish, the other gibbous, and one of them often perforated at the base; the hinge a linear projection, with a lateral tooth, which, in the flat valve, is inserted in the margin; two bony rays support the animal.

16. Mytilus. Shell coarse, generally affixed by its byssus; hinge generally without teeth, being distinguished by a linear, subulated, longitudinal furrow.

17. Pinna. A sub-bivalve, brittle, erect, and gaping, having a silky beard. The hinge without teeth; the valves adhere on one side.

Univalve Shells, or Cochleas.

18. Argonauta. Shell spiral, involute, membranaceous, and with one chamber.

19. Nautilus. Divided into many chambers, by partitions, perforated with projecting pipes.

20. Conus. Convoluted and turbinated shell; the aperture longitudinal, linear, open at both ends, and without teeth; the base entire, and the columella smooth.

21. Cypræa. Involuted, sub-ovate, obtuse, and smooth; the opening longitudinal, linear, dentated on each side, and extended to both ends of the shell.

22. Bulla. Convoluted, without spire, opening longitudinal, oblong, and contracted at the ends, entire at the base; the columella oblique and smooth.

23. Voluta. Unilocular and spiral; the aperture without a tail, and somewhat open at both ends; columella plaited, with no inner or columellar lip, nor umbilicus.

24. Buccinum. Spiral and gibbous; the aperture oval, terminating in a gutter, which, with the cauda, runs out to the right; the interior lip smooth.

25. Strombus. Spiral, with one side large, the aperture frequently with a dilated outer lip, terminating in a gutter which turns to the left.

26. Murex. Spiral and rough, with membranaceous sutures; the aperture ending in an entire, straight, or somewhat ascending gutter.

27. Trochus. Spiral, and nearly conical; the aperture nearly tetragonal or rounded, contracted transversely above; the columella oblique.

28. Turbo. Spiral and solid; the aperture contracted, orbicular, and entire.

29. Helix. Spiral, subdiaphanous and fragile; aperture close at the ends; within lunated, or partly circular, as if a segment of the circle had been cut off.

30. Nerita. Spiral, gibbous, and flattish below; the aperture semiorbicular, or semilunar; the lip of the columella transverse and flattishly truncated.

31. Haliotis. Ear-shaped; the mouth spread open; the spire lateral and flattened; the disc almost always perforated with a row of holes.

32. Patella. Nearly conical and without a spire.

33. Dentalium. Tubular, straight, with one chamber, open at both ends.

34. Serpula. Tubular, adhering to other bodies, often intercepted by entire partitions.

35. Teredo. Round, bending, and lodged wood.

36. Sabella. Tubular, formed by grains of sand, on a membranous sheath.

The French naturalists, whose late exertions have added much to the funds of this science, have thought it necessary to adopt some changes with respect to the preceding arrangement. These changes would, indeed, derive some support from the high characters which have suggested them; no one having done more of late years to the advancement of this species of knowledge than Bruguière and Lamarck. Their observations shall therefore be introduced under the several genera to which they apply, whilst the order in which they are taken shall be that of Bosc, in Histoire Naturelle des Coquilles.

Multivalve Shells.

Lamarck thinks that Pholades should be regarded as bivalves, having accessary pieces, and that the oscabrions (chitons) should be considered as naked molluscæ, whose backs are beset with small testaceous laminæ. Bosc, however, in conformity with accustomed practice, considers them among the multivalve shells.

Dacosta (Conchology, 8vo. p. 97.) observes that "The Greek name lepas, always synonymous with the Latin name patella, the latter signifying little sacrifice dishes, or saucers, was given to limpets from the earliest Grecian times, and the Roman name from their resemblance to those little dishes; yet Linnéus wantonly transposes the name of lepas to the balani." The French naturalists have still continued the name of lepas to the patellæ, and have separated those bodies which Linnéus had placed under the genus lepas, into two genera: 1. Anatifa, a cuniform shell composed of several flat unequal valves, connected together by a membrane, and united to the extremity of a tendinous tube fixed by its base; and, 2. Balanus, a conical multivalve shell, fixed by its base, and composed of six articulated valves, the openings closed by an operculum, with four valves. These shells had been united by Linnéus under one genus, most probably in consequence of the similarity of the animals by which they are inhabited; but the French naturalists observe, in confirmation of the propriety of the distinction which they have adopted, that very essential differences exist between the animals of the anatifæ and of the balani.

The teredo is considered by Bosc as a multivalve shell, formed of five unequal pieces; the largest is a cylindrical tube, in which the others are contained. Two extremely thin and nearly hemispherical pieces, resembling parts of a pholas, pointed at one of their ends, and beset on their outer surface with twenty-five rows of small teeth, like those of a file, are placed at their lower extremity, and by their action remove the wood, and form the cavity in which the shell becomes lodged.

At the superior extremity, that which communicates with the water, are two small roundish pieces, connected with the animal by cylindrical pedicles about their own length. When the animal stretches a little out of the tube, these valve-like pieces spread out, and when it re-enters, they contract and close the opening, through which the head, or rather the syphons of the animal had passed.

Bruguière has, apparently with much propriety, introduced a new genus which he has termed fistulana, the characters of which are a tubular club-formed shell, open at its smaller extremity, and containing in its cavity two valves. The shell, the examination of which led to this separation, is the Hercules club, considered by Gmelin as a teredo, and named by him teredo clava. The shells of this genus seem to differ from the teredines only in containing one, whilst the teredo contains two pair of valves. The phloas hians and phloas teredula of Gmelin appear to be merely the interior valves of two species of fistulanæ.

From the several species which Linnéus has collected under his genus anomia, Lamarck and Bruguière have formed six distinct genera, which they have named anomia, calceola, terebratula, crania, placuna, and hyalæa, which they describe as being thus characterised:

Anomia, an irregular shell, formed of two unequal valves, the inferior of which is either pierced or grooved at its beak, the opening being closed by a small operculum, or third valve, which fixes on other bodies, and is attached by a ligament. The hinge is without teeth. It is by possessing this third body, therefore, whether considered as valve or operculum, that this genus is distinguished.

Bivalve Shells.

Calceola. A regular bivalve shell, with unequal valves, the largest being in the form of a half sandal, and the smallest flat, semiorbicular, and resembling an operculum; the hinge with from one

to three small teeth. This shell is only known as a fossil, and is considered by Gmelin as an anomia (anomia sandalium). It is very thick, and about an inch in length. Its back is flattened; its interior is striated longitudinally, and its valve or operculum, concentrically.

Terebratula, a regular bivalve shell, with unequal valves, fixing itself by a ligament or short tube; the largest valve perforated at its summit, which is prominent and recurved; hinge with two teeth. The regularity of the valves, the absence of any operculum, the position of the hole, and the form of the hinge, separate this genus from that of anomia.

Crania, a regular bivalve shell, with unequal valves, the inferior almost smooth, and nearly round, and pierced in its internal face with three unequal and oblique holes; the superior valve very convex, furnished internally with two projecting callosities. The three holes in the inferior valve of this shell, induced Lamarck and Bruguière to separate it from the anomiæ, and place it in a distinct genus. The species described by Linnéus is named by him anomia craniolaris.

Placuna, an irregular bivalve flat shell; the interior hinge composed of two diverging ridges, which serve for the attachment of a ligament. Linnéus has arranged two species, anomia placenta, and anomia sella, under the genus anomia.

Hyalæa, a regular bivalve shell, with unequal, bulging, connées, transparent valves, gaping under the beak, and tricuspidated at the base. This genus is formed by Lamarck, from a shell described by Forskal, and denominated in Gmelin's Linnéus anomia tridentata, caudata and retusa. The clio pyramidata of Linnéus are also referable to this genus.

Lingula, a long flat shell, formed of two valves, nearly equal, truncated in the fore-part; the hinge without teeth; the beak of the valves pointed, and joined to a tendinous tube, which has a ligament to the shell, and fixes it to other solid bodies. Linnéus, who knew only of one valve of this shell, termed it patilla unguis.

Corbula is an unequal-valved, sub-transverse, smooth, regular shell; with a conical cardinal tooth, curved, or turned upwards, on each valve; interior ligament, and two muscular impressions. This genus is characterised by the inequality of its valves, one of them being nearly a third larger than the other. These shells are found fossil at Grignon, near to Versailles.

Orbicula is a genus formed by Lamarck from a shell which was discovered by Muller, and which was named by him patella anomala. Its differing so entirely from patellæ in being a bivalve, and its being inhabited by an animal totally different from that of the patella, has induced Lamarck thus to separate it from the genus patella. This shell is orbicular, but rather flattened, and composed of two valves; by the lowest of which, which is extremely delicate, it adheres to other bodies. Its hinge is not known.

Pandora is a regular inequivalved, and inequilateral shell; with two cardinal, oblong, unequal, and diverging teeth, in the upper valve; and two oblong pits in the other valve; and interior ligament, and two muscular impressions. The shell which gives rise to this genus is tellina inæquivalvis, of Linnéus; the inequality of the valves being the circumstance which is supposed to warrant the separation. This shell is named Pandora margaritacea, by Bruguière.

Lima. An inequilateral-eared bivalve; the valves a little gaping on one side; hinge without teeth; ligament external; beaks separated. This genus is founded chiefly on the ostrea lima of Linnéus, now named by Bruguière, lima squamos. The separation of these shells from the pectens, on the idea of their forming a byssus, whilst the pectens do not, requires, it should seem, a more accurate knowledge of the habits of the animals which occupy the different pectens.

Pecten. This, contrary to Linnéus, is adopted by Bruguière as a genus distinct from ostrea. Its characters are given: a regular bivalve shell; the valves unequal; the hinge without teeth, most commonly eared, with a triangular pit for the ligament. The hinge shutting by a black ligament fixed in this triangular pit, and the different forms of the shells are the circumstances which are supposed to warrant the proposed separation.

Pedum. The shell from which this genus has been formed, and of which only one species is known, being that which is figured by Chemnitz and Favanne, is semi-transparent, unequal-valved, eared; the inferior valve gaping; the beaks separated; hinge without teeth; ligament external, and attached to a long and narrow gutter. The upper valve is striated, and granulated longitudinally; but the under valve is smooth, sharply edged, and hollowed out in one part.

Perna. An irregular, flattish, bivalve, shell: the hinge composed of many linear, parallel teeth, disposed in a straight line, across. The hinge is closed by a ligament which is attached between the teeth, and which, by its thickness, prevents the teeth from articulating with each other. Ostrea perna, isogona, ephippium, pictum, and legumen, of Linnéus, are placed under this genus.

Avicula. This genus Lamarck forms from mytilus hirundo, Linnéus, which is the only shell in the genus. He describes it: an irregular, loose shell, a little gaping towards its beaks, and having the valves of unequal size. The hinge callous, without teeth; a little oblong pit, which is marginal and parallel with the edge which supports the ligament.

Malleus. The hammer-oyster of Linnéus, with two other species, form this genus, according to Lamarck, who gives for the characters of the genus: an irregular loose shell, a little gaping near its beaks, having equal valves; a callous hinge, without teeth, having a conical pit, placed obliquely on the edge of each valve. This genus seems to be hardly sufficiently distinguishable from the last; nor does the name of the genus appear to be well adapted, since some of the species no ways resemble a hammer in their form.

Vulsella. This genus is formed from the Mya vulsella of Linnéus. The uncertainty with which this shell has been viewed, at different periods, shows the uncertainty of its nature, and the propriety of not placing it under any other genus. Linnéus had once considered it as a pinna, and Bruguière as an oyster. It is a loose shell, longitudinal, and nearly equivalved, terminating in a very short bent beak; the hinge callous, depressed, and without teeth, of equal elevation on each valve, forming a rounded conical pit for the ligament.

Ostrea. In this genus is comprehended those shells only which are oysters, according to common acceptation. The characters of the genus are, therefore, an irregular, adherent, inequivalve shell; the hinge without teeth; an oblong pit, sulcated across, giving attachment to a ligament.

Gryphæa. The shell, for the reception of which this genus was established by Lamarck, was improperly considered as a species of anomia by Linnéus, and as a species of oyster by Bruguière; to which latter genus it undoubtedly very nearly approximates. It is a loose unequivalved shell: the inferior valve concave, terminated by a beak turned upwards, and bent into an involved spire; the superior valve smaller, like an operculum; the hinge without teeth, but with an oblong and dented pit; and one muscular impression in each valve. Lamarck enumerates eight fossil species of this genus.

Plicatula is a genus formed, by Lamarck, from spondylus plicatus of Linnéus. It is an angulated shell, with unequal valves and unequal beaks, which are pointed; the edges are in deep plaits; its hinge is formed of two strong teeth on each valve, and an intermediate pit for the reception of the ligament; with one muscular impression on each valve.

Spondylus. In this genus of Linnéus are comprised bivalve, irregularly-formed shells, the hinge of which is formed of two strong hooked teeth, and an intermediate pit for the ligament; in the inferior valve are two thick recurved teeth, with two intermediate rounded cavities to receive the teeth of the other valve, and an elongated pit in which the ligament is placed; in the superior valve are two exterior cavities for receiving the teeth of the other valve, and two teeth curving backwards, with a pit for the ligament.

Chama. This genus is appointed, by Bruguière and Lamarck, to those shells only which, in particular, possess unequal valves, and are adherent. The characters of the genus therefore are: a bivalve shell, with adhering unequal valves; the hinge composed of one oblique thick tooth, which may be crenulated or rough, and is articulated in a cavity in the opposite valve.

It was necessary, therefore, to establish other genera for the reception of those shells which thus become excluded from the genus chama. Hence Bruguière formed two new genera; cardita, having two teeth in the hinge; and tridacna, possessing the same number, but having the edges of the crescent crenulated and gaping. Lamarck has proceeded still further; he has subdivided the genus cardita from an isolated tooth, situated, in some species, under the corslet, as in cardum isocardia, and makes this his genus isocardia. He also makes another genus, hippopus, the species of which are subtransverse, inequilateral shells; the hinge with two compressed, inverted teeth, the crescent filled up: of this genus is chama gigax. But it is necessary still further to particularise these new genera.

Cardita, a loose inequilateral shell, the hinge with two teeth; the one at the base of the left valve, and the other longitudinal, parallel with the anterior face.

Hippopus. An inequilateral, subtransverse shell; the hinge with two compressed and inverted teeth; the crescent filled up. Hippopus, it is to be remembered, differs from tridacna by having its crenate filled, whilst in tridacna it is gaping.

Tridacna. An inequilateral, subtransverse shell; hinge with two teeth, compressed and inverted; the crescent gaping. The chama gigas of Linnéus (the tridacna gigas of Lamarck) is the only species under this genus.

Cardium. This genus remains unaltered by the French naturalists. The characters being: a subcordiform shell, with valves dentated on their edges; the hinge with four teeth; two cardinal, approximating obliquely in each valve, and articulating across with their correspondent teeth; the lateral teeth distant, and inverted in the opposite valve.

Acardo. Is a genus very properly established by Commercon. It is founded on two species: the generic characters of which are: a shell composed of two, nearly equal, flat valves; having neither hinge nor ligament; a muscular impression appearing on the centre of each valve.

Radiolites. This is a genus approximating to the preceding, but very properly separated from it by the form of the shell. The shell is of an irregular form, of unequal valves, striated on the outside; the inferior valve turbinated; the superior convex, or conical; no hinge nor ligament.

Erodona. This genus was formed, by Daudin, from two shells in the cabinet of Favannes. It is intermediate between the mya and mactra. It is a subtransverse, bivalve shell, irregular and gaping; one of the valves having a hollow tooth; and the other a pit between two projections; the ligament inserted on the tooth and in the pit.

Mya is a transverse shell, gaping at both ends; the ligament on the inside; the left valve having a cardinal tooth, compressed, rounded, perpendicular to the valve, and giving attachment to the ligament. This is the original genus of Linnéus, from which Bruguière and Lamarck have withdrawn many of the species to place them under the genera vulsella, glycemeris, and unio; leaving only those sea-shells which have a very projecting cardinal tooth in one of their valves.

Glycemeris. A transverse shell, gaping at both extremities: a protuberant hinge without teeth; the ligament on the outer part. Such is mya glycemeris of Linnéus.

Solen. A transverse shell, gaping at both extremities: the upper edge straight, or nearly so; two or three teeth at the hinge, furnished by both valves.

Tellina. Considerable confusion has arisen from the admission of species which by no means belong to this genus. Bruguière and Lamarck have divided the tellens of Linnéus into two new genera. 1. Tellina, a transverse or orbicular shell with equal valves, with a fold on the anterior side: one or two cardinal teeth, and two separated lateral teeth, as in tellina virgata. 2. Caspa, a transverse shell, with two teeth in one valve, and one tooth in the opposite valve, shutting between those of the other valve, as in tellina angulata.

Cyclas. This genus comprehends some shells which Linnéus had associated with tellens; but which Bruguière and Lamarck have separated from them, from their wanting the fold on the anterior side: the characters are: a suborbicular, or in a small degree, transverse shell, without fold on the anterior side; the ligament external and bulging; two or three cardinal teeth, and elongated, lamelliform, inserted lateral teeth. They are fresh-water shells.

Venus. This genus of Linnéus is formed by shells which are regular, suborbicular, bivalves, provided with a crescent and a corslet; three cardinal teeth near together, and sometimes one or two lateral teeth. The valves of this genus are generally pretty gibbous and thick; constantly equal, and nearly of a triangular form. Lamarck divides this genus into two. 1. Venus, a suborbicular or transverse shell, with three approximated

cardinal teeth, the lateral ones being more or less diverging. 2. Meretrix, a transverse or orbicular shell; with three approximated cardinal teeth, and one isolated tooth under the crescent. The genus caspa, mentioned above, is proposed by Bruguière and Lamarck to comprise several of the Venus's of Linnéus.

Ungulina. A regularly formed long bivalve; the hinge formed by a very small tooth between two oblique tents: the valves bearing the form of the finger nail. There is but one species in this genus. The hinge bears some resemblance to that of cardium, but the general form of the shell differs much from that of cardia.

Donax. A regular, transverse, inequilateral bivalve, with three cardinal teeth, and one or two separated lateral teeth. Shells of this genus have much of the triangular form, their sides very unequal; they are solid, thick, flattened at the inferior, and rounded at the opposite extremity. The ligament, which, in most shells with equal valves, is placed above the summit, is in these shells unequally distributed above and below it. Above, it is narrow and short; and below, it is thick, nearly round, and fills the cavity of the corslet exactly.

Mactra. A bivalve shell, regular, transverse, inequilateral, and a little gaping, the cardinal tooth having a pit for the ligament; lateral teeth compressed and inserted, or none.

Lamarck divides this genus into three. 1. Mactra, a transverse, inequilateral shell, a little gaping; the cardinal tooth folded in a furrow, articulating with that of the opposite valve, and accompanying a pit for the ligament; two lateral and inserted teeth, such is mactra stultorum. 2. Lutraria, a transverse, inequilateral shell, gaping at the extremities; two cardinal teeth, oblique, and diverging, accompanying a large pit for the ligament; no lateral teeth; such is mactra lutraria, Linnéus. 3. Paphia, a subtransverse, inequilateral shell, the valves close: a pit for the ligament on the beak between or near to the teeth of the hinge, as in Venus divaricata. Linnéus.

Crassatella. A genus formed by Lamarck of shells unknown to Linnéus, and which Bruguière had placed in the genus mactra. The generic characters are an inequilateral, subtransverse shell, with close valves, with a sunk crescent or corslet; the ligament internal; the pit for the ligament placed under the beaks, above the teeth of the hinge. There are two fossil, and one recent species under this genus. These shells are remarkable for the thickness of the valves, and for their two deep muscular impressions.

Trigonia. This is a genus formed by Lamarck, the species of which are known only in a fossil state. The characters of the genus are, an inequilateral subtrigonal shell, the hinge formed by two large flat diverging teeth, transversely grooved. These are the cunei of Dacosta.

Hiatella. A genus formed by Daudin on two shells from Tranquebar, which appear to be intermediate between the genera trigonia and tridacna; the characters are a transverse, irregular bivalve shell, gaping in its superior edge; its hinge a tooth in each valve, inserted in a groove in the opposite valve.

Cucullæa. A gibbous, subtransverse, inequilateral shell, with detached beaks: the hinge in a straight line, having a range of numerous teeth, transverse inserted; and at the extremities two or three parallel rib-like teeth, the ligaments external. This genus is founded by Lamarck on a recent shell from the Indian Sea, and on a fossil shell from Beauvais, which Bruguière had placed among the arks; from which these shells differ in the ribs placed at the extremities of the hinge.

Arca. An inequilateral bivalve shell; the hinge composed of numerous teeth, which lock in the interstices of those of the opposite valve, and which range in a straight, angular, or curved line. The ligament external. This genus of Linnéus has been subdivided by Lamarck into three genera. 1. Arca, with the teeth of the hinge in a straight line, as the arca noæ. 2. Pectunculus, with the hinge in a curved line; and 3. Nucula, which deserves a distinct notice.

Nucula. This genus has been formed by Lamarck from arca nucleus, Linn. Daudin has also added two more species. The shells of this genus evidently differ from the arks, in having their insides resplendent with the mother of pearl, and in having a large tooth at the hinge. The characters are, an inequilateral, almost triangular, or oblong shell; the hinge in a broken line, beset with numerous transverse and parallel teeth; one oblique cardinal tooth out of the line; the beaks contiguous and turned forwards.

Unio. A transverse shell with three muscular impressions; an irregular, callous, cardinal tooth, stretching on one side, under the corslet, and articulating with one of the opposite valve. In this genus, formed by Bruguière, are placed the mya margaritifera and pictorum of Linnéus.

Anodonta. A regular, transverse, bivalve shell, having three muscular impressions: a simple hinge without any tooth. In this genus are placed mytilus cygneus, anatinus, and fluviatilis of Linnéus, with three other species.

Mytilus. A regular transverse shell with equal valves, shutting close, a hinge without, or with one or two teeth. Lamarck divides the genus mytilus into four genera. 1. Mytilus, a longitudinal shell, with pointed terminating beaks; one muscular impression, and a hinge most frequently without teeth. 2. Modiolus, a subtransverse shell, the posterior extremity very short; the beaks sunk upon the short side of the shell; one muscular impression; the hinge simple, without teeth. 3. Avicula. 4. Anodonta.

Pinna. The characters of this genus are, a regular bivalve shell, with equal valves, wedge-formed, pointed at its base, gaping at its superior edge; hinge without teeth, and lateral ligament very long.

Univalve Shells.

Patella. A conical univalve shell, without a spire. Linnéus had divided these shells into five sections; the labiated, the dentated, the mucronated, the entire, and the perforated. Lamarck has divided this genus into five: 1. Patella, a shell of a shield or bonnet form, without a spire, whole at the top, and simple within. 2. Crepidula, an oval shell, with an incomplete spire, inclined on the edge; the cavity separated into two, by a simple diaphragm. 3. Calyptra, a conical shell, whole at the point; with a spiral diaphragm. 4. Fissurella, the shell pierced with a hole at the point. 5. Emarginula, a conical shell, summit inclined, concave beneath, and the posterior edge slit or grooved.

Planospirites. A suborbicular flattish univalve, having in its inferior face, on one side, a cord-like border, turning back in spiral turns on the disc of the shell. The genus is formed by Lamarck on a fossil shell found by Faujas among the fossils of

Maestricht; but the figure has not yet been given.

Testacella. A univalve shell, in form of an oblique cone, the summit being rather spiral, and the opening oval. This is the covering of the posterior part of a long gasteropodia from the isle of Teneriffe. This is therefore an animal between the slug and the snail.

Oscana. An oval, coriaceous, almost transparent univalve shell without a spire. The shell of this genus, and of which one species only is known, which is found adhering to prawns, is in form similar to the patellæ, and the animal approaches to that of the chiton.

Carinaria. A univalve shell, very thin; its form a cone, flattened on its sides; its summit rolled, spirally and very small; the back covered with a dentated keel; the opening entire, oval, oblong, and contracted towards the angle of the keel. Linnéus had placed this shell, which is exceedingly delicate, and as transparent as glass, among the patellæ, by the name of patella cristata, but Dargenville, Martini, and Gmelin, have ranged it under the argonauts by the name of argonauta vitrea. Bruguière appears to have been disposed rather to have replaced it among the patellæ; but Lamarck has thought it right to consider it as a species of a distinct genus.

Haliotis. A flattish ear-formed shell; the spire much sunk; the opening very large; much longer than wide; pierced with holes disposed in a line. No change is proposed in this genus of Linnéus by the French testaceologists.

Sigaretus. An oval, depressed, nearly ear-formed shell, with a short spiral columella; the opening entire, very large, widened near the top of the right lip, and longer than wide. This shell had been placed by Linnéus among the helices, under the name of helix haliotoidea; and by Muller among the bullæ, under the name of bulla velutina; but Lamarck seems very properly to have disposed of it under a distinct intermediate genus between the nerites and the ear-shells.

Stomatia. Is a genus which has been formed by Helblins and Lamarck from a shell, which had been placed under the genus haliotis, but which wanted the holes, which exist in the shells of that genus.

Argonauta. A very thin, single chambered, univalve shell; the spire concealed in the internal part of the shell.

Concholepas. An oval univalve, convex in its superior part, with its summit obliquely inclined upon the left edge; the cavity simple; two teeth and a sinus at the base of the right edge. Dargenville and others had placed the shell of this genus among the patellæ; but Bruguière having seen several with tendinous opercula, disposed them under the genus buccinum. Lamarck has, however, thought fit to consider it as forming a genus, connecting the patellæ with the other spire valved shells.

Nerita. A semiglobular univalve, flattish beneath, not umbilicated at the spire; the opening semicircular; the columella or partition nearly transverse. Lamarck has retained in this genus only the imperforated nerites; the others he transfers to the next genus. The nerites have not only no umbilicus, but no true columella, having in its place a simple partition; which is flat, thin, and longitudinal, originating in the groove of the first spire, and generally dentated.

Natica. This genus of Lamarck's is characterized by a nearly globular shell, umbilicated at the left lip with a callosity at the umbilicus; the opening semicircular; the columella oblique, and not dentated.

Helicina. This genus is founded by Lamarck on a shell figured by Lister, (Plate LXXI. fig. 59,) and which he describes as a globular shell; the opening entire, semioval; columella with a callus, compressed inferiorly; an operculum. The propriety of this adoption cannot be judged of, from merely the figure of this shell in Lister's work.

Helix. An orbicular or elongated univalve, with an obtuse or concave spire; the opening entire, forming a half moon. Lamarck divides the shells which have been hitherto disposed under this genus into eight genera. 1. Bulimus, an oval or oblong shell, the opening whole, longer than wide; the columella smooth, without folds, truncature or widening at the base; as in bulima hæmastoma. 2. Lymnæa, an oblong subturriculated shell, longer than wide; opening entire, the inferior part of the right edge, turning up and passing into the opening, and forming a very oblique fold on the columella; as in helix stagnalis. 3. Melania, a turriculated shell; the opening entire, oval or oblong, widened at the base of the columella; helix amarula is of this genus. 4. Ampullaria, a globular bellied shell, umbilicated at its base, no callosities on the left lip; the opening entire, longer than wide. Helix ampullacea forms this genus. 5. Planorbis. A discoid shell, the spire flattened or sunk, not prominent, the opening entire, longer than wide, and filled up laterally by the convex projection of the last turn but one. The type of this genus is helix planorbis. 6. Haliotidea. 7. Ianthina. 8. Helix, a globular shell, with a convex or conoidal spire; and particularly with the opening diminished by the projection of the last turn but one; but as this last character is common to the planorbis also, these two genera are evidently confounded. The separation which is hereafter made of some shells which originally were in the genus helix, in agreement with the ideas of Bruguière, will be, therefore, more correct.

Volvaria, a cylindrical shell, twisted on itself, without a projecting spire; the opening narrow, as long as the shell; one or more folds on the base of the columella. This genus was formed by Lamarck from a shell which is figured and described by Pennant, vol. iv. Plate LXX. fig. 85. He considers it as intermediate between bulla and bulima.

Bulla. A tumid shell, the spire not projecting; the opening as long as the shell; no umbilicus. This genus of Linnéus has been much reduced by Bruguière, who placed several species under bulima, and established his genus ovula. Lamarck has still further reduced them, by forming the genera terebellum, pyrula, ampulla and achatina.

Ianthina. This genus is formed by Lamarck on a single shell described by Lister, Brown, Forskal, and other naturalists; which derives its claims of distinction from helix, not so much from the character of the shell as from that of the animal, which differs in its structure materially from the animal of the helix, since it is furnished with a curious apparatus, being an inhabitant of the sea, for swimming, instead of that for crawling, with which the helices are provided. It is nearly globular, and almost diaphanous; the

opening is nearly triangular, with an angular sinus at the right edge.

Turritella. This genus was formed by Lamarck, for the reception of those shells which Linnéus had placed in the last section of his genus turbo, as towers; and which Dargenville and Favanne had considered as screws. The characters of the genus are, a turriculated shell; the opening round, whole, but having a sinus at the right edge.

Cyclostoma. This genus was formed by Lamarck for the reception of the wentletrap, and other shells of the same character. The propriety of thus forming a new genus is rendered evident by the doubts which had arisen respecting the placing of it in any old genus. Linnéus having considered it a turbo; Rumphius, a buccinum; Dargenville, a screw; and Davila, Gualteri, Guettard, and Favanne, merely a tube, from its not possessing a columella, which they considered as essential in a univalve shell. The shells of this genus differ in their forms; their openings are nearly round, and their sides connected circularly. The shell is formed of seven spires, separated by a void space; with ten or twelve longitudinal ribs, which uniting, form a rim round the lip. These ribs externally supply the place of a columella.

Bulimus. A globular, oval, or turriculated shell, the opening of which is entire, not grooved at the base, and always longer than wide. This genus of Bruguière comprises some of the shells considered by Linnéus as helices and bullæ; and the genera auricula, pyramidella, melania, lymnæa, agathina, maillot, and bulima, of Lamarck. The essential character distinguishing this genus from helix is the opening being longer than it is wide.

Turbo. A conoidal or turriculated shell; the opening entire, round, without any tooth; the edges disjoined on the superior part. Several shells which were reckoned by Linnéus of this genus have been removed from it by Bruguière, and placed under his genus bulima, and others have been taken from it by Lamarck, and disposed under the genera cyclostoma and turritella.

Trochus. A conical univalve shell; the opening almost always quadrangular, flattened transversely; the columella oblique. Lamarck has divided this genus into four: 1. Trochus. 2. Solarium, with an open umbilicus, or crenulated opening on the inside of the spiral turnings, as in the trochus perspectivus. 3. Monodenta. The opening rounded, and furnished with a tooth formed by the truncated and projecting base of the columella, as in trochus labio, Linnéus. 4. Pyramidella; the columella projecting, perforated at its base, and possessing three transverse folds, as in trochus dolabratus, Linnéus.

Cerithium. A univalve turriculated shell, the opening terminated at its base by a short, narrow canal, either suddenly turning backwards, or truncated, but never grooved out. In this genus of Bruguière are comprehended several shells from the genera trochus, strombus, and murex of Linnéus. The shells differ from those of murex by their turriculated form; and from the screws, in not having the groove at the base of the canal.

Pyrula. A subpyriform shell, canaliculated at its base; without any projections, and having the belly part nearer to its summit than to its base; the spire short; the columella smooth; the right edge without a groove. Lamarck founding the distinction on the situation of the bellied part of the shell, and on the greater or less length of the spire, has formed two new genera; one with those shells possessing this character of the genus bulla, and the other of the genus murex, calling the former pyrula, and the latter fusus.

Murex. An oval or elongated univalve shell, generally foliated, plaited, spinous, or tuberculated; the opening always prolonged into a canal, running straight, or turning directly backwards, and always entire. In the earlier stages of their growth it is difficult to separate the murices from the strombi. Lamarck divides this genus of Linnéus into five genera. 1. Murex, with tuberculated or spinous projections, and channelled at the base, as M. ramosus. 2. Fusus; fusiform, without projections, with the bellied part either equally distant from the extremities or nearest to the base; spire elongated; columella smooth; right edge without groove, as M. colus. 3. Fasciolaria; nearly fusiform; no projections; with two or three very oblique folds on the columella; and channelled at the base, as in M. tulipa. 4. Pleurotoma: fusiform or turriculated, without projections, and having a groove, or sinus, near the summit of the right edge, as in M. babylonicus. 5. Cerithium, already described.

Rostellaria. Lamarck has formed this genus on strombus fusus, (Linnéus) and on some fossil species found at Courtagnon. The characters of the genus are: a fusiform shell, terminating inferiorly by a canal with a pointed beak; the right edge entire or dentated; dilated more or less in a wing, according to age, and having a sinus contiguous to the canal.

Strombus. A bellied univalve, terminating at its base by a canal, accompanied with a distinct sinus; the right lip dilating, or spreading itself out, with age, in a simple or digitated lobe. Lamarck divides the genus strombus of Linnéus into three. 1. Strombus; terminating in a short canal, truncated or grooved out; the right edge dilating, with age, into a simple entire wing or lobe; with a sinus distinct from the groove at the base, as in S. pugilis. 2. Pterocera; a bellied shell, terminated inferiorly by an elongated canal; the right edge dilating with age in a digitated wing, and having a sinus near its base, as in S. lambus. 3. Rostellaria, the genus last described.

Buccinum. An oblong or oval shell, the opening of which is terminated at the base by an oblique groove, without any sensible canal, or external border. Bruguière has divided the buccina of Linnéus into the genera buccinum, terebra, cassidæa, and purpura. Under the genus buccinum are therefore here comprised tumid shells, with from three to ten spiral turns; a summit generally flattish; a surface rarely even; the predominating colours dull; the lip extended more or less in a bow, and rarely jagged.

Cassidæa. A tumid shell, the opening longer than wide, terminated at its base by a short canal, recurved towards the back of the shell; the columella plaited in the lower part. This genus of Bruguière is intended to comprise the helmets (casques) of Gualteri, Klein, and others.

Terebra. A turriculated univalve; the opening grooved in the lower part; the base of the columella twisted or oblique.

Purpura. An oval shell, generally with spines, or tuberculated; the opening terminating in a very short canal, the extremity of the canal grooved out, the base of the columella finishing in

a point. The shells included in this genus by Bruguière are not those species which have been hitherto considered as purpuræ by Dargenville and others, and which belong to the genus murex; but those species which appear to connect the genus buccinum and murex. The opening of these shells is rather large, oval, round, upwards, and more contracted in the inferior part; the right lip has but little thickness, and is grooved or notched; the left expands with a wrinkled ridge, which terminates in the groove.

Voluta. A cylindrical, or oval, univalve shell, grooved out at the base, but without a gutter; the opening longer than wide; and the columella plaited. The division of this genus by Linnéus is very clear and useful; but Lamarck proposes a still nicer distinction of the shells of this genus, by dividing them into eight genera. 1. Voluta, an oval shell, more or less bellied, summit obtuse, or mammillated; the base grooved, but without a gutter; the columella with several plaits, of which the lowest are largest and longest; as in voluta musica. 2. Oliva, sub-cylindrical, grooved at the base; the turns of the spire separated by a channel; the columella striated obliquely, as in voluta oliva. 3. Ancilla, oblong, a short spire, base of the opening hardly grooved; a swelling, or oblique roll, at the base of the columella. 4. Mitra, fusiform or turriculated, spire pointed at the summit, the base grooved out, without a gutter; the columella with plaits, the lowest being the least, as in voluta episcopalis. 5. Columbella, marked by a swelling on the internal face of the right edge; as in voluta mercatoria. 6. Marginella, the right edge emarginated, as in voluta vespertilio. 7. Cancellaria, the right edge grooved internally, and the base of the opening almost entire, as in voluta reticulata. 8. Turbinella, subturbinated, canaliculated at its base, with transverse plaits on the columella.

Ovula. A tumid shell, more or less elongated at the extremities; the edges rolled inwards; the opening longitudinal, not dentated on the left side. This genus is formed by Lamarck from shells, which had been comprised by Linnéus in his genus bulla. The shells of the genus ovula differ from those of cypræa, chiefly by the absence of teeth from the left side. Bulla volva, ovum, spelta, verrucosa, and gibbosa, of Linnéus, are placed under this genus.

Terebellum, a shell nearly cylindrical, pointed at the summit; the opening longitudinal, narrow upwards, and hollowed out at its base; the columella truncated. This genus is formed by Lamarck, of the bulla terrebellum of Linnéus, which he has removed from the genus bulla, and has placed in this genus, as intermediate between the ovulæ and the olives.

Cypræa. A convex, univalve shell, the edges turned inwards; the opening long and narrow, and toothed on each side. The shells of this genus are so distinctly characterized as to have escaped that confusion which has taken place in many other genera.

Conus. A conical convoluted univalve; the opening of the length of the shell, linear, without teeth, and hollowed out at the top; the columella smooth. The generic characters are here so determinate, as not to have left any opportunity for changing the acceptation of this genus, as established by Linnéus.

Vermicularia. A tubular shell, twisted in an irregular spiral, in general adhering to some body; and furnished with an operculated opening. The shells with which Lamarck has formed this genus were blended by Linnéus with the serpulæ; but the animals which inhabit these shells are very different from the terebrellæ, which are the only inhabitants of the true serpulæ.

Silicaria. A tubular shell, spirally convoluted, and laterally divided through its whole length by a narrow fissure; the mouth roundish. Linnéus himself considered it as doubtful whether the shell which forms this genus (serpula anguina) should be placed under the genus serpula, or not; but Bruguière, Lamarck, and Daudin, have thought it necessary to establish for it this new genus.

Penicellus. A long, tubular, conical shell, the superior extremity closed by a disc, beset with numerous short tubes, and surrounded by a projecting coronet; the inferior extremity having been fixed to some solid body. Linnéus had doubted whether the shell, of which Bruguière has formed this genus, ought not to be placed under the genus teredo, rather than under that of serpula, where, however, he left it.

Nautilus. A spiral and nearly discoidal shell, the last turn of which envelopes the rest, and the sides of which are smooth: numerous chambers formed by transverse smooth septa, perforated by a tube. This genus is divided by Lamarck into three. 1. Nautilus. 2. Spirula. 3. Orthocera.

Orbulites. A spiral and nearly discoidal shell, the last spire enveloping the rest; the sides articulated by winding sutures; the transverse septæ being pierced by a marginal tube. The shells which Lamarck has assumed for this genus have been hitherto confounded with the ammonites: they are only known as fossils and as casts.

Ammonites. A discoidal spiral shell, the turns contiguous and all visible, the sides articulated by foliated sutures, and the transverse septæ terminating in winding processes, and pierced by a marginal tube. These, like the shells of the preceding genus, are only with certainty known to exist as fossils.

Planulites. A discoidal spiral shell, with contiguous and visible turns, with smooth sides, and transverse septæ, not foliated. These shells are supposed to bear the same relationship to the ammonites as the nautili do to the ammonites; but the difference between them and the ammonites is so little as must often be with difficulty discoverable.

Camerina. A shell with a single valve, without any external spire, the internal part divided into numerous chambers by imperforated septa. This genus was formed by Bruguière for the reception of the fossil shells long known as lapides lenticulares and nummulites.

Rotalites. A depressed, orbicular, discoidal chambered shell, smooth on the upper, radiated on the under side, with tubercular and unequal points in the centre; the edge carinated, and having a small trigonal marginal opening. The fossil shell on which this genus was formed is figured and described by Guettard in his Memoirs on Fossils.

Turrilites. A spiral turbinated shell, with contiguous and visible turns, the sides articulated by winding sutures; transverse pierced septa, with foliated terminations; the opening round. The shells belonging to this genus are all fossil, and even the fragments of their casts are very rare.

The characters of the shells of this genus are very striking, their internal structure being similar to that of the ammonites, whilst they possess a turriculated or wreathed form.

Baculites. A straight, cylindrical, and rather conical shell; the sides articulated by winding sutures; the transverse septa terminating in foliaceous forms. This genus is founded on a fossil shell described by Faujas St. Fond in his Natural History of St. Peter's Mountain near Maestricht, and which he considers as a straight ammonite.

Spirula. A shell partially or completely in a discoidal spire; the turns separate, and the last extending into a straight line; transverse smooth septa, pierced by a tube; the opening round. This genus comprises also the lituites, a fossil shell, resembling the preceding, but larger.

Belemnistes. A many-chambered, straight, long, conical shell, with a lateral cleft. This also is only known in a mineral state.

SHE'LTER. *s.* (ſcyld, a shield, Saxon.) 1. A cover from any external injury or violence (*Dryden*). 2. A protector; a defender; one that gives security (*Psalms*). 3. The state of being covered; protection; security (*Denham*).

To SHE'LTER. *v. a.* (from the noun.) 1. To cover from external violence (*Milton*). 2. To defend; to protect; to succour with refuge; to harbour (*Dryden*). 3. To betake to cover (*Atterbury*). 4. To cover from notice (*Prior*).

To SHE'LTER. *v. n.* 1. To take shelter (*Milton*). 2. To give shelter (*Thomson*).

SHE'LTERLESS. *a.* (from *shelter*.) Harbourless; without home or refuge (*Rowe*).

SHE'LVING. *a.* (from *shelf*.) Sloping; inclining; having declivity (*Shakspeare*).

SHE'LVY. *a.* (from *shelf*.) Shallow; rocky; full of banks (*Shakspeare*).

To SHEND. *v. a.* pret. and part. pass. *shent*, (ſcendan, Saxon; *schenden*, Dutch.) 1. To ruin; to spoil; to mischief (*Dryden*). 2. To disgrace; to degrade; to blame; to reproach (*Shakspeare*). 3. To overpower; to crush (*Spenser*).

SHENSTONE (William), a poet, born at Hales-Owen, Shropshire, 1714. He was taught to read by an old dame, whose kind services he has transmitted to posterity in his schoolmistress. After being at Hales-Owen school, and at Solihul, he removed in 1732 to Pembroke college, Oxford, but took no academical degree. After wandering about and visiting sometimes London, sometimes Bath, yet without forgetting the muses, he settled, 1745, on his estate. His object here was not to increase his income, but to improve the beauties of his estate; and by degrees, through injudicious expence, he brought on himself pecuniary distress. He was a lamp, as his biographer observes, that spent its oil in blazing. He was attacked by a putrid fever which proved fatal, at the Leasowes, 11th Feb. 1763. The tenderness and generosity of his character are mentioned with deserved applause. He was kind to all within his influence, but so irascible, that, if once offended, he was not easily appeased. He was inattentive to economy, and careless of his expences, but his life was unstained by any crime. His mind was not very comprehensive, nor his curiosity active, and he esteemed light those parts of learning which he had not cultivated. His works have been published in 3 vols. 8vo. consisting of 26 elegies, songs, odes, ballets, moral pieces, &c. written with ease, elegance, and simplicity. His epistolary correspondence afterwards appeared in 2 vols. 8vo. and recollections of his life have been published by Graves. (*Lempriere*).

SHE'PHERD. *s.* (ſceap, sheep, and hỳꝛd, a keeper, Saxon; ꝑceapahyꝛd.) 1. One who tends sheep in the pasture (*Shakspeare*). 2. A swain; a rural lover (*Raleigh*). 3. One who tends the congregation; a pastor (*Prior*).

SHE'PHERDESS. *s.* (from *shepherd*.) A woman that tends sheep; a rural lass.

SHEPHERD'S NEEDLE, in botany. See SCANDIX.

SHEPHERD'S POUCH, in botany. See BURSA.

SHEPHERD'S ROD, in botany. See TEAZEL.

SHE'PHERDISH. *a.* (from *shepherd*.) Resembling a shepherd; suiting a shepherd; pastoral; rustic; not in use (*Sidney*).

SHEPPEY, an island in Kent, at the mouth of the Thames, separated from the mainland by a branch of the Medway, called the East Swale. It yields plenty of corn, and feeds numerous flocks of sheep. It contains the borough of Queenborough and the fort of Sheerness.

SHEPTON MALLET, a town in Somersetshire, with a market on Friday, and a considerable manufacture of woollen cloth. It is seated under the Mendip hills, 17 miles S.W. of Bath, and 116 W. of London.

SHERARDIA. Little field-madder. In botany, a genus of the class tetrandria, order monogynia. Corol one-petalled, funnel-form, superior; seeds two, three-toothed. Three species, S. muralis, a native of Italy, with decumbent stems, flowers in pairs; S. fruticosa, a shrubby plant of Ascension Island with sessile, axillary flowers; S. arvensis, with terminal flowers, the leaves all whorled, indigenous to our own fallow fields.

SHE'RBET. *s.* (*sharbat*, Arabic.) The juice of lemons or oranges mixed with water and sugar.

SHERBORN, a town in Dorsetshire, with a market on Thursday and Saturday. It was formerly a bishop's see, and had three churches, though now there is but one, which was the cathedral, and in which are interred the Saxon kings Ethelbard and Ethelbert. It had also a castle, now in ruins. There is a famous free-school founded by Edward VI.; two large silk mills; and a conduit of excellent water, which is continually running. It is 16 miles N.W. of Dorchester, and 118 W. by S. of London. Lon. 2. 41 W. Lat. 50. 54 N.

SHERBORN is also the name of a town in

the West Riding of Yorkshire, with a market on Friday; 14 miles S.W. of York.

SHERD. *s.* (rceapd, Saxon.) A fragment of broken earthenware (*Dryden*).

SHERIDAN (Thomas), a divine and poet, born about 1684, in the county of Cavan, Ireland. After finishing his education at Dublin college, he kept a school in Dublin, and obtained celebrity by the number of his scholars. He was presented by the friendship of Swift to a living in the south of Ireland, worth about 150*l.* per ann. but his sermon on these words, "sufficient for the day is the evil thereof," on the anniversary of the first George's birthday, seemed so pointed, that he ruined all hopes of further preferment. He exchanged his living for that of Dunboyne, and again exchanged that for the free school of Cavan; but dissatisfied with the air, or more properly with the inhabitants, he sold it for 400*l.* He died some time after in indigent circumstances, 1738, aged 55. Lord Corke describes him as better acquainted with books than men, as slovenly, indigent, and chearful, yet in the midst of his poverty still a quibbler, a punster, a fiddler, and a wit, who never suffered the day to pass without a rebus, an anagram, or a madrigal. He published a prose translation of Persius, with notes, 12mo. 1739, &c.

SHERIDAN (Thomas), son of the preceding, was born at Quilca, in Ireland, and educated at Westminster school and Dublin university. Showing a partiality for the stage, he, in 1743, when 22 years old, personated Richard III. in the Smock-alley theatre; after which he exhibited at Covent-garden. In 1744 he undertook the management of the Dublin stage, but met with such opposition in his attempts to reform abuses, that a conspiracy was formed against him. Driven from Dublin, he became an itinerant lecturer on elocution, and acquired such celebrity, that not only his own university, but Cambridge honoured him with the degree of M. A. About 1760, he appeared at Drury-lane theatre, and had the interest to obtain a pension from the government. In 1767 he engaged at the Haymarket, and for a while amused the town with his attic evening, an entertaining medley of singing, music, and repetition. He quitted the stage in 1776, to succeed as manager of Drury-lane; but he resigned three years after, and had recourse to his lectures. He died at Margate, 1788, aged 67. He was author of several works, the best known of which are a dictionary of the English language, 4to. and 2 vols. 12mo.—British education, or the source of the disorders of Great Britain, 8vo.—lectures on the art of reading, 8vo.—dissertation on the causes and difficulties of learning the English tongue, 4to.—course of lectures on elocution, &c. 4to.—life of Swift, &c.

SHERIFF, or SHIRE-REVE, an officer in each county of England, of very great antiquity; his name being derived from the two Saxon words *scire*, province or shire; or rather from *sciran*, to divide, and *geresa*, grave, reve, or prefect; the sheriff being denominated from the first division of the kingdom into counties.

He is called in Latin *vice-comes*, as being the deputy of the earl or comes, to whom the custody of the shire is said to have been committed at the first division of this kingdom into counties; but the earls being afterwards unable, by reason of their high employments, and attendance on the king's person, to transact the business of the county, the labour was committed to the sheriff, who now performs all the king's business in the county; and though he be still called *vice-comes*, yet he is entirely independent of, and not subject to the earl: the king, by his letters patent, committing *custodiam comitatus* to the sheriff.

Sheriffs were formerly chosen by the inhabitants of the several counties; in confirmation of which, it was ordained by 28 Edw. I. c. 8. that the people should have election of sheriffs in every shire, where the shrievalty is not of inheritance; for anciently in some counties the sheriffs were hereditary, as judge Blackstone apprehends, they were in Scotland, till the statute 20 Geo. II. c. 43. and still continue in the county of Westmoreland to this day: the city of London having also the inheritance of the shrievalty of Middlesex vested in their body by charter. This election, says the same author, was, in all probability, not absolutely vested in the commons, but required the royal approbation. For in the Gothic constitution, the judges of their county courts (which office is executed by our sheriff) were elected by the people, but confirmed by the king: and the form of their election was thus managed; the people, or *incolæ territorii*, chose twelve electors, and they nominated three persons, *ex quibus rex unum confirmabat*. But, with us in England, these popular elections growing tumultuous, were put an end to by the statute 9 Edw. II. st. 2. which enacted, that the sheriffs should from thenceforth be assigned by the chancellor, treasurer, and the judges, as being persons in whom the same trust might with confidence be reposed. By statutes 14 Edw. III. cap. 7. 23 Hen. VI. c. 8. and 21 Hen. VIII. c. 20. the chancellor, treasurer, president of the king's council, chief justices, and chief baron, are to make this election on the morrow of All Souls in the exchequer: and the king's letters patent, appointing the new sheriffs, used commonly to bear date the sixth day of November. 12 Edw. IV. c. 1.

And the custom now is, which has obtained since the time of Henry VI. that all the judges, together with the other great officers, meet in the exchequer chamber on the morrow of All Souls yearly (which day is now altered to the morrow of St. Martin, by the last act for abbreviating Michaelmas term), and then and there propose three persons to the king, who afterwards appoints one of them to be sheriff.

This custom of the twelve judges proposing three persons seems borrowed from the Gothic constitution before-mentioned; with this

difference, that among the Goths the twelve nominees were first elected by the people themselves: which usage of ours was probably founded upon some statute, though not now to be found among our printed laws. But notwithstanding an unanimous resolution of all the judges of England to this purpose, entered in the council book of 3 March, 34 Hen. VI. and the statute 34 and 35 Hen. VIII. cap. 26. sect. 61. which expressly recognizes this to be the law of the land; some of our writers have affirmed, that the king, by his prerogative, may name whom he pleases to be sheriff, whether chosen by the judges or no. This is grounded on a very particular case in the fifth year of queen Elizabeth, when, by reason of the plague, there was no Michaelmas term kept at Westminster, so that the judges could not meet there in *crastino animarum*, to nominate the sheriffs; whereupon the queen named them herself, without such previous assembly, appointing for the most part one of the two remaining in the last year's list. And this case, so circumstanced, is the only authority in our books for making these extraordinary sheriffs.

However, it must be acknowledged, that the practice of occasionally naming what are called pocket-sheriffs, by the sole authority of the crown, hath uniformly continued to the reign of his present majesty, Geo. III. in which, says Blackstone, few, if any, instances have occurred.

By four several statutes it is enacted, that no one shall be sheriff, except he have sufficient land within the shire to answer the king and his people in any matter of complaint. 9 Edw. II. st. 2. 4 Edw. III. c. 9. 5 Edw. III. c. 4. 14 & 15 Car. II. c. 21.

It has been adjudged, that an attorney is exempted from the office of sheriff, by reason of his attendance on the courts of Westminster.

By 2 Geo. III. c. 20. no person, during the time he is acting as a militia officer, shall be obliged to serve the office of sheriff.

Protestant dissenters, who are exempted by the toleration act from the obligation of complying with the requisition of the corporation act, and who can plead their non-compliance as a reasonable and sufficient excuse, are not compellable to serve this office, nor of course to pay any fine for refusal. See Furneaux's Letters to Blackstone, ed. 2. and particularly the Appendix, containing lord Mansfield's speech in the house of lords 1767, on the cause between the city of London and the dissenters, when the house affirmed the unanimous judgment of the commissioners delegates, who delivered their opinions *seriatim* on the 5th of July, 1762, after hearing counsel several days.

By a by-law of the city of London, no freeman chosen sheriff, &c. shall be excused, unless he voluntarily swears he is not worth 10,000*l.* &c. and if he refuses to take the office, he incurs a forfeiture of 400*l.*

The sheriff, before he exercises any part of his office, and before his patent is made out, is to give security in the king's remembrancer's office in the exchequer, under penalty of 100*l.* for the payment of his proffers, and all other profits of the sheriffwick; he must also take the oaths of allegiance and abjuration, and all, except the sheriffs of Wales and Chester, an oath appointed by 3 Geo. I. cap. 15. sect. 18. for the due execution of their office. This oath may be administered in pursuance of a writ of *dedimus potestatem*.

Sheriffs, by virtue of several old statutes, are to continue in their office no longer than one year; and yet it hath been said, that a sheriff may be appointed *durante bene placito*, or during the king's pleasure, and so is the form of the royal writ; therefore, till a new sheriff be named, his office cannot be determined, unless by his own death, or the demise of the king.

And by 1 Ann. st. 1. c. 8. all officers appointed by the preceding king may hold their offices for six months after the king's demise, unless sooner displaced by the successor.

We may farther observe, that by 1 Rich. II. c. 11. no man, that has served the office of sheriff for one year, can be compelled to serve the same again within three years after.

The power and duty of a sheriff are those that belong to him as a judge, as the keeper of the king's peace, as a ministerial officer of the superior courts of justice, or as the king's bailiff.

In his judicial capacity he is to hear and determine all causes of forty shillings value and under, in his county-court; and he has also a judicial power in divers other civil cases. He is likewise to decide the elections of knights of the shire (subject to the controul of the house of commons), of coroners, and of verderors; to judge of the qualification of voters, and to return such as he shall determine to be duly elected, but incapable of being elected himself for the county, &c. of which he is returning officer.

As the keeper of the king's peace, both by common law and special commission, he is the first man in the county, and superior in rank to any nobleman therein, during his office. He may apprehend and commit to prison all persons who break the peace, or attempt to break it; and may bind any one in a recognizance to keep the peace. He may, and is bound, *ex officio*, to pursue and take all traitors, murderers, felons, and other misdoers, and commit them to gaol for safe custody. He is also to defend his county against any of the king's enemies, when they come into the land; and for this purpose, as well as for keeping the peace and pursuing felons, he may command all the people of his county to attend him; which is called the posse comitatus, or power of the county; which summons, every person above fifteen years of age, and under the degree of a peer, is bound to attend upon warning, on pain of fine and imprisonment. Yet he cannot exercise the office of a justice of the peace, for then this inconvenience would arise, that he should command himself to execute his own precepts. 1 Black. 343.

The sheriff has a jurisdiction both in criminal and civil cases, and therefore he has two courts: his town court, for criminal causes, which is the king's court; the other is his county court, for civil causes, and this is the court of the sheriff himself. When the new sheriff is appointed and sworn, he ought, at or before the next county court, to deliver a writ of discharge to the old sheriff, who is to set over all the prisoners in the gaol, severally by their names, (together with all the writs), precisely, by view and indenture between the two sheriffs; wherein must be comprehended all the actions which the old sheriff has against every prisoner, though the executions are of record; and till the delivery of the prisoners to the new sheriff, they remain in the custody of the old sheriff, notwithstanding the letters patent of appointment, the writ of discharge, and the writ of delivery. Neither is the new sheriff obliged to receive the prisoners, but at the gaol; but the office of the old sheriff ceases when the writ of discharge is brought to him.

By 3 George I. c. 15, it shall not be lawful for any person to buy, sell, let, or take to farm the office of under sheriff, or deputy sheriff, or seal keeper, county clerk, shire clerk, gaoler, bailiff, or any other office pertaining to the office of high sheriff, or to contract for any of the said offices, on forfeiture of 500*l.*; one moiety to his majesty, the other to such as shall sue in any court at Westminster, within two years after the offence.

Provided that nothing in this act shall prevent any high sheriff from constituting an under sheriff, or deputy sheriff, as by law he may; nor to hinder the under sheriff in any case of the high sheriff's death, when he acts as high sheriff, from constituting a deputy; nor to hinder such sheriff, or under sheriff, from receiving the lawful perquisites of his office, or for taking security for the due answering the same; nor to hinder such sheriff or under sheriff, deputy sheriff, seal keeper, &c. from accounting to the high sheriff for all such lawful fees as shall be by them taken, nor for giving security so to do, or to hinder the high sheriff from allowing a salary to his under sheriff, &c. or other officers. And if any sheriff shall die before the expiration of his year, or before he be superseded, the under sheriff shall nevertheless continue in his office, and execute the same in the name of the deceased, till another sheriff be appointed and sworn; and the under sheriff shall be answerable for the execution of the office during such interval, as the high sheriff would have been; and the security given by the under sheriff and his pledges shall stand a security to the king, and all persons whatsoever, for the performing his office during such interval.

There is no particular qualification in lands required for the office of sheriff, but a sheriff cannot be elected to serve in parliament for the county of which he is sheriff. The under sheriff performs nearly all the duties of the sheriff. He is not to hold his office above one year, under the penalty of 200*l.* And no under sheriff or bailiff shall practise as an attorney; but this is so openly evaded, that no person is appointed under sheriff except an attorney.

SHE'RIFFALTY. SHE'RIFFDOM. SHE'RIFFSHIP. SHE'RIFFWICK. *s.* (from *sheriff.*) The office or jurisdiction of a sheriff (*Bacon*).

SHERIFFE OF MECCA, the title of the descendants of Mahomet by Hassan Ibn Ali.

SHERLOCK (William), a learned English divine in the 17th century, was born in 1641, and educated at Eton school, where he distinguished himself by the vigour of his genius and his application to study. Thence he was removed to Cambridge, where he took his degrees. In 1669, he became rector of the parish of St. George, Botolph-lane, in London; and in 1681 was collated to the prebend of Pancras, in the cathedral of St. Paul's. He was likewise chosen master of the Temple, and had the rectory of Therfield, in Hertfordshire. After the revolution he was suspended from his preferment, for refusing the oaths to king William and queen Mary; but at last he took them, and publicly justified what he had done. In 1691 he was installed dean of St. Paul's. His Vindication of the Doctrine of the Trinity engaged him in a warm controversy with Dr. South and others. Bishop Burnet tells us, he was "a clear, a polite, and a strong writer; but apt to assume too much to himself, and to treat his adversaries with contempt." He died in 1707. His works are very numerous; among these are, 1. A Discourse concerning the Knowledge of Jesus Christ, against Dr. Owen. 2. Several pieces against the Papists, the Socinians, and Dissenters. 3. A practical Treatise on Death, which is much admired. 4. A practical Discourse on Providence. 5. A practical Discourse on the future Judgment; and many other works.

SHERLOCK (Dr. Thomas), late bishop of London, was the elder son of Dr. William Sherlock, and born in 1678. He was sent, after a proper preparation, to Catherine-hall, Cambridge, where he took his degrees, and of which he became master. He was made master of the Temple very young, upon the resignation of his father; and, what is very remarkable, this mastership was held successively by father and son for more than seventy years. He was likewise dean of Chichester. His first appearance as an author, as far as we are able to discover, was in the way of controversy; and that too carried on with uncommon warmth and spirit. He was at the head of the opposition against Hoadly, then bishop of Bangor; during which contest he published a great number of pieces. In 1728, he was preferred to the bishopric of Bangor; and translated thence to Salisbury in 1734. In 1747, upon the death of Potter, he had an offer made him of the archbishopric of Canterbury, but declined it, on account of the very ill state of health he was then in; yet, recovering in a good degree, he ventured to succeed Gibson in the see of London, the year after.

But bodily infirmities began to affect him very much; and, though for three or four years he applied himself to business, and made one general visitation of his diocese in person, yet he was then visited with a very terrible illness, which deprived him almost first of the use of his limbs, and then of his speech, insomuch that he could not be understood but by those who were constantly about him. Still the powers of his understanding continued in their full vigour; and under this weak state of body, in which he lay many years, he revised, corrected, and published, four volumes of sermons in 8vo. which, besides the excellencies they have in common with the best productions in this way, are particularly to be admired for their ingenuity and elegance. He died July 18, 1761, in his 84th year.

SHE'RRIS. SHE'RRIS SACK. SHE'RRY. *s.* (from *Xeres*, a town of *Andalusia* in *Spain*.) A kind of Spanish wine (*Shakspeare*).

SHETLAND, the general name of about forty islands, lying 100 miles N.N.E. of Caithnessshire, in Scotland, between 52. 56 and 61. 11 N. lat. The names of the principal are Mainland, Yell, Unst, and Fula or Thule. The description given of the largest, or Mainland, will enable the reader to form an idea of the others; and as the particulars of the climate, inhabitants, &c. are much the same as in the ORCADES, we must refer to that article for them. Some curious particulars of the Merry Dancers, as they are called in these islands, may be seen under the word AURORA BOREALIS. Shetland with Orkney, form one of the counties of Scotland, according to many arrangements.

SHEW. See SHOW.

SHIDE. *s.* (from ꝛcea̅an, to divide, Sax.) A board; a cutting (*Skinner*).

SHIELD. *s.* (ꝛcyld, Saxon.) 1. A buckler; a broad piece of defensive armour held on the left arm to ward off blows (*Shakspeare*). 2. Defence; protection. 3. One that gives protection or security (*Dryden*).

To SHIELD. *v. a.* (from the noun.) 1. To cover with a shield. 2. To defend; to protect; to secure (*Smith*). 3. To keep off; to defend against (*Spenser*).

The form of the shield is represented by the escutcheon in coats of arms.

The shield was that part of the ancient armour on which the persons of distinction in the field of battle always had their arms painted; and most of the words used at this time to express the space that holds the arms of families, are derived from the Latin name for a shield, *scutum*. The French *escu*, and *escussion*, and the English word, *escutcheon*, or, as we commonly speak it, *scutcheon*, is evidently from this origin; and the Italian *scudo* signifies both the shield of arms, and that used in war.

The Latin name *clypeus*, for the same thing, seems also to be derived from the Greek word γλυφειν, to engrave; and it had this name from the several figures engraved on it, as marks of distinction of the person who wore it.

The shield in war, among the Greeks and Romans, was not only useful in the defence of the body, but it was also a token, or badge of honour to the wearer, and he who returned from battle without it, was always treated with infamy afterwards.

People have at all times thought this honourable piece of the armour the properest place to engrave, or figure on the signs of dignity of the possessor of it; and hence, when arms came to be painted for families in after-times, the heralds always chose to represent them upon the figure of a shield, but with several exterior additions and ornaments; as the helmet, supporters, and the rest.

The form of the shield has not only been found different in various nations, but even the people of the same nation, at different times, have varied its form extremely; and among several people there have been shields of several forms and sizes in use, at the same period of time, and suited to different occasions.

The most ancient and universal form of shields, in the earlier ages, seems to have been the triangular. This we see instances of in all the monuments and gems of antiquity: our own most early monuments shew it to have been the most antique shape also with us, and the heralds have found it the most convenient for their purposes, when they had any odd number of figures to represent; as if three, then two in the broad bottom part, and one in the narrow upper end, it held them very well; or if five, they stood as conveniently, as three below, and two above. The other form of a shield, now universally used, is square, rounded and pointed at the bottom: this is taken from the figure of the Samnitic-shield used by the Romans, and since copied very generally by the English, French, and Germans.

Those who were to fight on foot, according to Columbier, had their shields hung up by the right corner, and those who were to fight on horseback, had theirs hung up by the left. This position of the shields in heraldry is called *couche* by some writers, though by the generality *pendant*.

It was very frequent in all parts of Europe, in arms given between the eleventh and fourteenth centuries; but it was to be observed, that the hanging by the left corner, as it was the token of the owner's being to fight on horseback, so it was esteemed the most honourable and noble situation; and all the pendant shields of the sons of the royal family of Scotland and England, and of our nobility at that time, are thus hanging from the left corner.

SHIELD, in heraldry, the escutcheon or field on which the bearings of coats of arms are placed. The surface of the shield is termed the field, because it contains such honourable marks as anciently were acquired in the field: and it is divided into several points, or locations; as the dexter point, sinister point, honour point, nombril point, &c. See HERALDRY.

SHIELDS (North), a seaport in Northumberland, on the river Tyne, near its mouth, with a market on Wednesday. It has wide

and airy streets in every direction, and, with South Shields on the opposite side of the river, may be deemed the port of Newcastle, for the largest vessels are stationed here to take in their lading, which is brought down in barges and lighters. It extends to Tynemouth on the E. and many elegant detached mansions are erected in the neighbourhood. The number of inhabitants in 1801 was 7280. It is seven miles E. by N. of Newcastle, and 276 N. by W. of London. Lon. 1. 4 W. Lat. 54. 58 N.

SHIELDS (South), a town in the county of Durham, on the river Tyne, opposite North Shields, with which place it enjoys all the advantages of trade and commerce in common with Newcastle. It consists principally of one narrow street, two miles in length, with an open square near the middle. Many trading vessels are built here, and it has very considerable salt works, and several glass works. The number of inhabitants in 1801 was 8103. It is 19 miles N.N.E. of Durham, and 275 N. by W. of London.

To SHIFT. *v. n.* (*skitpa*, Runic, to change.) 1. To change place (*Woodw.*). 2. To change; to give place to other things (*Locke*). 3. To change clothes, particularly the linen (*Young*). 4. To find some expedient; to act or live though with difficulty (*Daniel*). 5. To practise indirect methods (*Raleigh*). 6. To take some method for safety (*L'Estrange*).

SHIFT. *v. a.* 1. To change; to alter (*Swift*). 2. To transfer from place to place (*Tusser*). 3. To put by some expedient out of the way (*Bacon*). 4. To change in position (*Raleigh*). 5. To change, as clothes (*Shakspeare*). 6. To dress in fresh clothes (*Shakspeare*). 7. *To* SHIFT *off*. To defer; to put away by some expedient (*Rogers*).

SHIFT. *s.* (from the verb.) 1. Expedient found or used with difficulty; difficult means (*More*). 2. Indirect expedient; mean refuge; last resource (*Bacon*). 3. Fraud; artifice; stratagem (*Denham*). 4. Evasion; elusory practice (*South*). 5. A woman's under linen.

SHIFT, in music. That motion of the hand along the finger-board of a violin, violoncello, &c. necessary to the execution of passages the notes of which, in point of gravity or acuteness, lie at a considerable distance from each other.

SHI'FTER. *s.* (from *shift*.) One who plays tricks; a man of artifice (*Milton*).

SHI'FTLESS. *a.* (from *shift*.) Wanting expedients; wanting means to act or live (*Derham*).

SHILLING, an English silver coin, equal to 12 pence, or the 20th part of a pound sterling.

This was a Saxon coin, being the 48th part of their pound weight. Its value at first was five-pence; but it was reduced to four-pence about a century before the conquest. After the conquest, the French solidus of 12 pence, which was in use among the Normans, was called by the English name of shilling; and the Saxon shilling of four-pence took a Norman name, and was called the *groat*, or great coin, because it was the largest English coin then known in England. From this time, the shilling underwent many alterations.

Many other nations have also their shillings. The English shilling is worth about 23 French sols; those of Holland and Germany about half as much, or 11½ sols; those of Flanders about nine. The Dutch shillings are also called *sols de gros*, because equal to 12 gross. The Danes have copper shillings, worth about one-fourth of a farthing sterling.

In the time of Edward I. the pound troy was the same as the pound sterling of silver, consisting of 20 shillings; so that the shilling weighed the 20th part of a pound, or more than half an ounce troy. But some are of opinion, there were no coins of this denomination, till Henry VII. in the year 1504, first coined silver pieces of 12 pence value, which we call shillings. Since the reign of Elizabeth, a shilling weighs the 62d part of a pound troy, or three dwts. 20$\frac{20}{31}$ grs. the pound weight of silver making 62 shillings. And hence the ounce of silver is worth 5*s.* 2*d.* or 5$\frac{1}{2}$ shillings.

SHILL-I-SHALL-I. A corrupt reduplication of *shall I?* To stand *shill-I-shall-I*, is to continue hesitating (*Congreve*).

SHILOH is a term famous among interpreters and commentators upon Scripture. It is found (Gen. xlix. 10.) to denote the Messiah. The patriarch Jacob foretels his coming in these words: "The sceptre shall not depart from Judah, nor a lawgiver from between his feet, until Shiloh come; and unto him shall the gathering of the people be." The Hebrew text reads, עד כי יבא שלה until Shiloh come. All Christian commentators agree, that this word ought to be understood of the Messiah, or Jesus Christ; but all are not agreed about its literal and grammatical signification. St. Jerome, who translates it by *Qui mittendus est*, manifestly reads Shiloach, sent, instead of *Shiloh*. The Septuagint have it Εως αν ελθη τα αποκειμενα αυτω; or, Εως αν ελθη ᾧ αποκειται, (as if they had read שלו instead of שלה), i. e. "Until the coming of him to whom it is reserved;" or, "Till we see arrive that which is reserved for him."

It must be owned, that the signification of the Hebrew word Shiloh is not well known. Some translate, "the sceptre shall not depart from Judah, till he comes to whom it belongs;" שלה or שלי instead of לי שלו. Others, "till the coming of the peace-maker;" or, "the pacific;" or, "of prosperity," שלה *prosperatus est*. Shalah signifies "to be in peace, be in prosperity; others, "till the birth of him who shall be born of a woman that shall conceive without the knowledge of a man;" שול or שליא *secundina fluxus*; otherwise, "the sceptre shall not depart from Judah, till its end, its ruin; till the downfall of the kingdom of the Jews," שלה or שאל "it has ceased, it has finished." Some Rabbins have taken the name Siloh or Shiloh, as if it signified the city of this name in Palestine: "The sceptre shall not be taken away from Judah till it comes to Shiloh; till it shall be taken from him to be given to Saul at Shi-

loh." But in what part of Scripture is it said, that Saul was acknowledged as king, or consecrated at Shiloh? If we would understand it of Jeroboam, the son of Nebat, the matter is still as uncertain. The Scripture mentions no assembly at Shiloh that admitted him as king. A more modern author derives Shiloh from שלה, *fatigare*, which sometimes signifies to be weary, to suffer; "till his labours, his sufferings, his passion shall happen."

But not to amuse ourselves about seeking out the grammatical signification of Shiloh, it is sufficient for us to show, that the ancient Jews are in this matter agreed with the Christians: they acknowledge that this word stands for the Messiah the king. It is thus that the paraphrasts Onkelos and Jonathan, that the ancient Hebrew commentaries upon Genesis, and that the Talmudists themselves, explain it. If Jesus Christ and his apostles did not make use of this passage to prove the coming of the Messiah, it was because then the completion of this prophecy was not sufficiently manifest. The sceptre still continued among the Jews: they had still kings of their own nation in the persons of the Herods; but soon after the sceptre was entirely taken away from them, and has never been restored to them since.

The modern Jews seek in vain to put forced meanings upon this prophecy of Jacob; saying, for example, that the sceptre intimates the dominion of strangers, to which they have been in subjection, or the hope of seeing one day the sceptre, or supreme power, settled again among themselves. It is easy to perceive that all this is contrived to deliver themselves out of perplexity. In vain likewise they take refuge in certain princes of the captivity, whom they pretend to have subsisted beyond the Euphrates, exercising an authority over their nation little differing from absolute, and being of the race of David. This pretended succession of princes is perfectly chimerical; and though at certain times they could show a succession, it continued but a short time, and their authority was too obscure, and too much limited, to be the object of a prophecy so remarkable as this was.

See Newton on the Prophecies, Dissertation 4th. vol. i. pp. 48—58, edition of 1803. Ancient Universal History, vol. ii. c. 7. pp. 486—488, Dublin ed. of 1745. La Pluche's Truth of the Gospel vindicated, vol. i. pa. 151.

SHI'LY. *ad.* (from *shy*.) Not familiarly; not frankly.

SHIN. *s.* (ꝛcina, Saxon; *schien*, German.) The forepart of the leg (*Shakspeare*).

SHIN (Loch), a lake of Scotland, in the S. part of Sutherlandshire, 15 miles long and two broad. At its S.E. extremity issues the rapid river Shin, which flows into the head of the frith of Dornoch.

To SHINE. *v. n.* preterit *I shone, I have shone*; sometimes *I shined, I have shined.* (ꝛinan, Saxon; *schijnen*, Dutch.) 1. To have bright resplendence; to glitter; to glisten; to gleam (*Denham*). 2. To be without clouds (*Bacon*). 3. To be glossy (*Locke*). 4. To be gay; to be splendid (*Spenser*). 5. To be beautiful (*Pope*). 6. To be eminent or conspicuous (*Addison*). 7. To be propitious (*Numbers*). 8. To give light real or figurative (*Milton*).

SHINE. *s.* (from the verb.) 1. Fair weather (*Locke*). 2. Brightness; splendour; lustre (*Pope*).

SHI'NESS. *s.* (from *shy*.) Unwillingness to be tractable or familiar (*Arbuthnot*).

SHI'NGLE. *s.* (*schindel*, German.) A thin board to cover houses (*Mortimer*).

SHINGLES. Zona. Zoster. Cingulí. An erysipelatous herpetic eruption, extending sometimes round the body, in small distinct vesicles, which itch intolerably, and induce a high degree of fever. See HERPES.

SHI'NY. *a.* (from *shine*.) Bright; splendid; luminous (*Dryden*).

SHIP, a general name for all great vessels with sails, fit for navigation on the sea; but in sea language, the term is more particularly applied to a vessel furnished with three masts, each of which is composed of a lower mast, top-mast, and top-gallant-mast, with the usual machinery thereto belonging.

The invention of ships is very ancient, and, at the same time, very uncertain. Mythologists attribute it to Dædalus, and pretend that the wings he invented to save himself withal from the labyrinth of Crete, were nothing but sails, which he first gave to vessels, and wherewith he eluded the vigilance and pursuit of Minos. Others give the honour to Janus, on the credit of some ancient Greek and Latin coins, on one side whereof is represented his double face, and on the reverse a ship. Lastly, others look on Noah to have been the first ship-builder.

The most celebrated ships of antiquity are, that of Ptolemy Philopater, which is said to have been two hundred and eighty cubits (i. e. four hundred and twenty feet) long, thirty-eight broad, and forty-eight high: it carried four thousand rowers, four hundred sailors, and three thousand soldiers. That which the same prince made to sail on the Nile, we are told, was three hundred and twelve feet long, forty-five feet broad, with a mast one hundred and twenty feet high. Yet these were nothing in comparison with Hiero's ship, built under the direction of Archimedes, on the structure whereof, Moschion, as we are told by Snellius, wrote a whole volume. There was wood enough employed in it to make sixty gallies. It had all the variety of apartments of a palace: banqueting-rooms, galleries, gardens, fish-ponds, stables, mills, baths, a temple of Venus, &c. It was encompassed with an iron rampart, and eight towers, with walls and bulwarks, furnished with machines of war, particularly one, which threw a stone of three hundred pounds, or a dart twelve cubits long, the space of half a mile; with many other particulars related by Athenæus. Deipnosophist. lib. v. p. 204, &c. ed. Causab. Lugd. 1657.

The vessels which are usually comprehended under the general name of ship, besides those of the line of battle, are galleons, frigates, hag-boats, differing from frigate built ships in the figure of the stern, which has a great resemblance to that of the cat, as being in a middle degree between both, cats, barks, pinks, and fly-boats, all of which are defined in their proper places.

Ships of war are distinguished from each other by their several ranks or classes. See RATE.



A Fore Section of a First Rate Ship of War, shewing its various Timbers & Apartments.

Murlow Sc. Rayfield Col.

London, Published by Sherwood & Co. Paternoster Row, Dec.r 1.1812.

A First Rate Ship of War with Rigging &c. at Anchor.

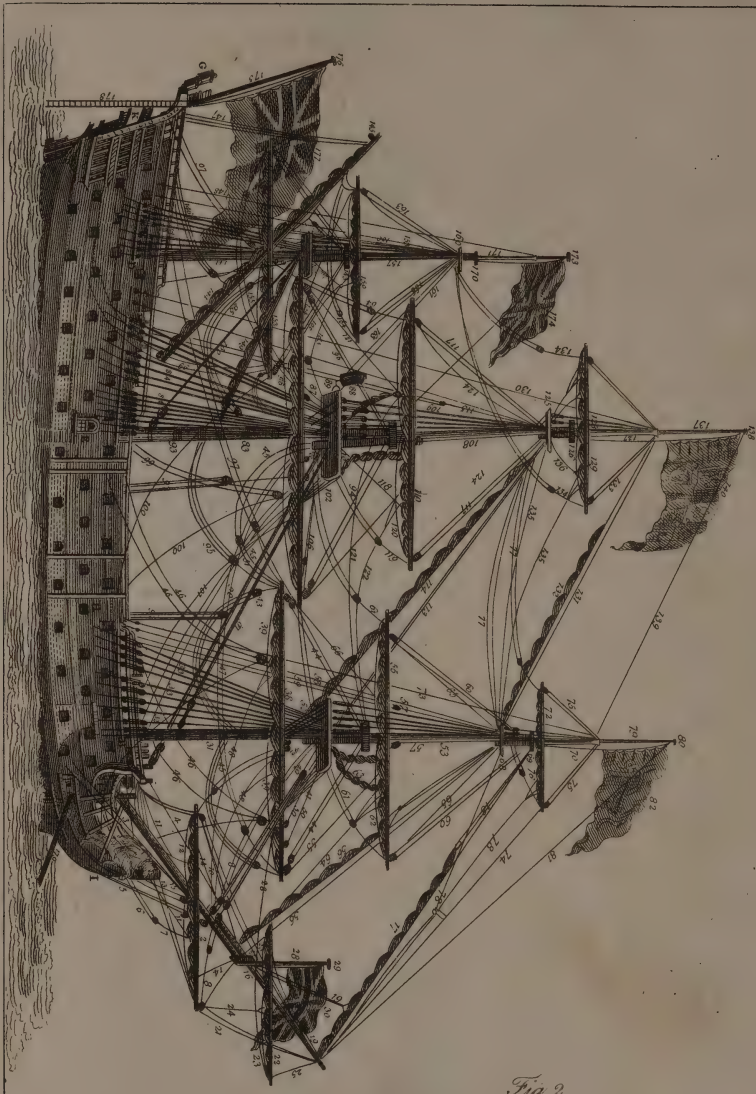
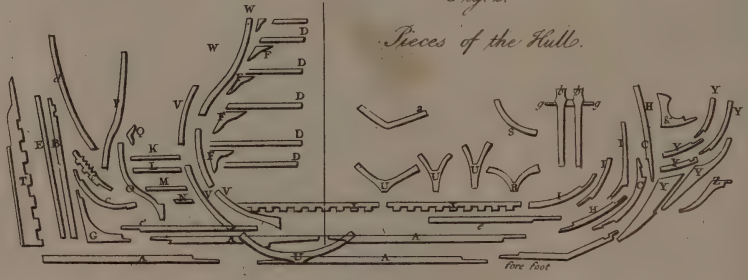


Fig. 2.

Pieces of the Hull.



Mutlow Sc. Russell Co.

London, Published by Sherwood & Cº Paternoster Row, Decr 1, 1812.

Vessels carrying less than 20 guns are denominated sloops, cutters, fire-ships, and bombs. It has lately been proposed to reduce the number of these rates, which would be a saving to the nation, and also productive of several material advantages.

In Plate 156, is the representation of a first rate, with rigging, &c. the several parts of which are as follow:

Parts of the *hull*.—A, The cat head; B, The fore-chain-wales, or chains; C, The main-chains; D, The mizen-chains; E, The entering port; F, The hawse-holes; G, The poop-lanterns; H, The chess-tree; I, The head; K, The stern.

1, The bowsprit. 2, Yard and sail. 3, Gammoning. 4, Manrop. 5, Bobstay. 6, Spritsail-sheets. 7, Pendants. 8, Braces and pendants. 9, Halliards. 10, Lifts. 11, Clue-lines. 12, Spritsail-horses. 13, Buntlines. 14, Standing-lifts. 15, Bowsprit-shroud. 16, Jib-boom. 17, Jibstay and sail. 18, Halliards. 19, Sheets. 20, Horses. 21, Jib guy. 22, Spritsail-topsail yard. 23, Horses. 24, Sheets. 25, Lifts. 26, Braces and pendants. 27, Cap of bowsprit. 28, Jack-staff. 29, Truck. 30, Jack flag.—31, *Fore-mast*. 32, Runner and tackle. 33, Shrouds. 34, Laniards. 35, Stay and laniard. 36, Preventer-stay and laniard. 37, Woolding of the mast. 38, Fore yard and sail. 39, Horses. 40, Top. 41, Crow-foot. 42, Jeers. 43, Yard-tackles. 44, Lifts. 45, Braces and pendants. 46, Sheets. 47, Foretacks. 48, Bow-lines and bridles. 49, Fore bunt-lines. 50, Fore leech-lines. 51, Preventer brace. 52, Futtock-shrouds.—53, *Foretop-mast*. 54, Shrouds and laniards. 55, Fore-top-sail yard and sail. 56, Stay and sail. 57, Runner. 58, Back-stays. 59, Halliards. 60, Lists. 61, Braces and pendants. 62, Horses. 63, Clew-lines. 64, Bow-lines and bridles. 65, Reef-tackles. 66, Sheets. 67, Buntlines. 68, Cross trees. 69, Cap. 70, Foretop-gallant-mast. 71, Shrouds. 72, Yard and sail. 73, Backstays. 74, Stay. 75, Lifts. 76, Clew-lines. 77, Braces and pendants. 78, Bowlines and bridles. 79, Flag-staff. 80, Truck. 81, Flag-stay-staff. 82, Flag of the lord high admiral.—83, *Mainmast*. 84, Shrouds. 85, Laniards. 86, Runner and tackle. 87, Futtock-shrouds. 88, Top-lantern. 89, Crank of ditto. 90, Stay. 91, Preventer stay. 92, Stay-tackles. 93, Woolding of the mast. 94, Jeers. 95, Yard-tackles. 96, Lifts. 97, Braces and pendants. 98, Horses. 99, Sheets. 100, Tacks. 101, Bowlines and bridles. 102, Crow-foot. 103, Cap. 104, Top. 105, Buntlines. 106, Leech-lines. 107, Yard and sail.—108, *Main-topmast*. 109, Shrouds and laniards. 110, Yard and sail. 111, Futtock shrouds. 112, Backstays. 113, Stay. 114, Staysail and halliards. 115, Tye. 116, Halliards. 117, Lifts. 118, Clew-lines. 119, Braces and pendants. 120, Horses. 121, Sheets. 122, Bowlines and bridles. 123, Buntlines. 124, Reef-tackles. 125, Cross trees. 126, Cap.—127, *Main-top-gallant-mast*. 128, Shrouds and laniards. 129, Yard and sail. 130, Backstays. 131, Stay. 132, Stay-sail and halliards. 133, Lifts. 134, Braces and pendants. 135, Bowlines and bridles. 136, Clew-lines. 137, Flagstaff. 138, Truck. 139, Flagstaff-stay. 140, Flag-standard.—141, *Mizen-mast*. 142, Shrouds and laniards. 143, Cap. 144, Yard and sail. 145, Block for signal halliards. 146, Sheet. 147, Pendant-lines. 148, Peck-brails. 149, Staysail. 150, Stay. 151, Derrick and span. 152, Top. 153, Cross-jack-yards. 154, Cross-jack lifts. 155, Cross-jack braces. 156, Cross-jack slings.—157, *Mizen-top-mast*. 158, Shrouds and laniards. 159, Yard and sail. 160, Backstays. 161, Stay. 162, Halliards. 163, Lifts. 164, Braces and pendants. 165, Bowlines and bridles. 166, Sheets. 167, Clew-lines. 168, Staysail. 169, Cross-trees. 170, Cap. 171, Flagstaff. 172, Flagstaff-stay. 173, Truck. 174, Flag, union. 175, Ensign staff. 176, Truck. 177, Ensign. 178, Stern ladder. 179, Bower cable.

In pl. 157, is a vertical longitudinal section of a first rate ship of war, with references to the principal parts; which are as follow: A, Is the head, containing—1, The stem; 2, The knee of the head or cutwater; 3, The lower and upper cheek; 4, The trail-board; 5, The figure; 6, The gratings; 7, The brackets; 8, The false stem; 9, The breast hooks; 10, The hawse holes; 11, The bulk head forward; 12, The cat-head; 13, The cat hook; 14, Necessary seats; 15, The manger within board; 16, The bowsprit. B, Upon the forecastle.—17, The gratings; 18, The partners of the mast; 19, The gun-wale; 20, The belfry; 21, The funnel for smoke; 22, The gangway going off the forecastle; 23, The forecastle guns. C, In the forecastle—24, The door of the bulkhead forward; 25, Officers cabins; 26, Staircase; 27, Fore-top-sail sheet bits; 28, The beams; 29, The carlings. D, The middle gundeck forward—30, The fore-jeer bits; 31, The oven and furnace of copper; 32, The captain's cook room; 33, The ladder or way to the forecastle. E, The lower gun-deck forward—34, The knees fore and aft; 35, The spirketings, or the first streak next to each deck, the next under the beams being called clamps; 36, The beams of the middle gun deck fore and aft; 37, The carlings of the middle gun-deck fore and aft; 38, The fore-bits; 39, The after or main bits; 40, The hatchway to the gunner's and boatswain's store-rooms; 41, The jeer capstan. F, The orlop—42, 43, 44, The gunner's, boatswain's, and carpenter's store-rooms; 45, The beams of the lower gun-deck; 46, 47, The pillars and the riders, fore and aft; 48, The bulk-head of the store-rooms. G, The hold—49, 50, 51, The foot-hook rider, the floor rider, and the standard, fore and aft; 52, The pillars; 53, The step of the foremast; 54, The kelson, or false keel, and dead rising; 55, The dead-wood. H, At midships in the hold—56, The floor timbers; 57, The keel; 58, The well; 59, The chain-pump; 60, The step of the main-mast; 61, 62, Beams and carlings of the orlop fore and aft. I, The orlop amidships—63, The cable tire; 64, The main hatchway. K, The lower gun-deck amidships—65, The ladder leading up to the middle gun deck; 66, The lower tire of ports. L, The middle gun-deck amidship—67, The middle tire of ports; 68, The entering port; 69; The main jeer bits; 70, Twisted pillars or stanchions; 71, The capstan; 72, Gratings; 73, The ladder leading to the upper deck. M, The upper gun-deck amidships—74, The main topsail-sheet bits; 75, The upper partners of the main-mast; 76, The gallows on which spare topmasts, &c. are laid; 77, The foresheet blocks; 78, The rennets; 79, The gun-wale; 80, The upper gratings; 81, The drift brackets; 82, The piss dale; 83, The capstan pall. N, Abaft the mainmast—84, The gangway off the quarterdeck; 85, The bulkhead of the coach; 86, The staircase down to the middle gun-deck; 87, The beams of the upper deck; 88, The gratings about the mainmast; 89, The coach or council-chamber; 90, The staircase up to the quarter deck. O, The quarterdeck—91, The beams; 92, The carlings; 93, The partners of the mizenmast; 94, The gangway up to the poop; 95, The bulkhead of the cuddy. P, The poop—

96, The trumpeter's cabin; 97, The tafforel. Q, The captain's cabin. R, The cuddy, usually divided for the master and secretary's officers. S, The state-room, out of which is made the bed chamber and other conveniences for the commander in chief; 98, The entrance into the gallery; 99, The bulkhead of the great cabin; 100, The stern lights and after galleries. T, The ward room, allotted for the lieutenants and marine officers; 101, The lower gallery; 102, The steerage and bulkhead of the wardroom; 103, The whipstaff, commanding the tiller; 104, The after staircase leading down to the lower gun deck. V, Several officers cabins abaft the mainmast, where the soldiers generally keep guard. W, The gunroom—105, The tiller commanding the rudder; 106, The rudder; 107, The stern-post; 108, The tiller transom; 109, The several transoms, viz. 1, 2, 3, 4, 5; 110, The gun-room ports, or sternchase; 111, The bread-room scuttle, out of the gun-room; 112, The main capstan; 113, The pall of the capstan; 114, The partner; 115, The bulk head of the bread-room. X, The bread-room. Y, The steward's room, where all provisions are weighed and served out. Z, the cockpit, where are subdivisions for the purser, the surgeon, and his mates. AA, The platform or orlop, where provision is made for the wounded in the time of service; 116, The hold abaft the main-mast; 117, The step of the mizen-mast; 118, The kelson or false keel; 119, The dead wood, or rising.

Ships of war are fitted out either at the expense of the state or by individuals. Those fitted out at the public expense are called king's ships, and are divided into SHIPS OF THE LINE, FRIGATES, SLOOPS, &c. For an account of each of these, see the respective articles. Ships of war fitted out by individuals are called privateers. See the article PRIVATEER.

SHIP (Fire). See FIRE-SHIP.

SHIP (Hospital), a vessel fitted up to attend on a fleet of men of war, and receive their sick or wounded; for which purpose her decks should be high, and her ports sufficiently large. Her cables ought also to run upon the upper deck, to the end that the beds or cradles may be more commodiously placed between decks, and admit a free passage of the air to disperse that which is offensive or corrupted.

SHIP (Merchant), a vessel employed in commerce to carry commodities of various sorts from one port to another. The largest merchant ships are those employed by the different companies of merchants who trade to the East Indies. They are in general larger than our 40 gun ships; and are commonly mounted with 20 guns on their upper-deck, which are nine pounders; and six on their quarter-deck, which are six pounders.

SHIP (Store), a vessel employed to carry artillery or naval stores for the use of a fleet, fortress or garrison.

SHIP (Transport), is generally used to conduct troops from one place to another.

To SHIP, is either used actively, as to embark any person or put any thing aboard ship: or passively, to receive any thing into a ship; as, "we shipped a heavy sea at three o'clock in the morning."

To SHIP, also implies to fix any thing in its place; as, to ship the oars, that is, to put them in their rowlocks; to ship the swivel guns, is to fix them in their sockets; to ship the handspokes, &c.

SHIP. *s.* (ɾcip, ɾcyp, Saxon; *schap*, Dutch.) A termination noting quality or adjunct, as *lordship*; or office, as *stewardship*.

SHI'PBOARD. *s.* (*ship* and *board.*) 1. This word is seldom used but in adverbial phrases: *a shipboard, on shipboard,* in a ship (*Dryden*). 2. The plank of a ship (*Ezekiel*).

SHI'PBOY. *s.* (*ship* and *boy.*) Boy that serves in a ship (*Shakspeare*).

SHIPBUILDING, the manner of constructing ships; including the delineation of them on a plane, the adjustment of the relative dimensions of the parts, and the framing and joining together the whole.

PART I.—ART OF DELINEATING SHIPS ON A PLANE.

All edifices, whether civil or military, are known to be erected in consequence of certain established plans, which have been previously altered or improved till they have arrived at the desired point of perfection. The construction of ships appears also to require at least as much correctness and precision as the buildings which are founded upon terra firma: it is therefore absolutely necessary that the mechanical skill of the shipwright should be assisted by plans and sections, which have been drawn with all possible exactnesss, examined by proper calculations, and submitted to the most accurate scrutiny.

Naval architecture may be distinguished into three principal parts. 1. To give the ship such an exterior form as may be most suitable to the service for which she is designed. 2. To give the various pieces of a ship their proper figures; to assemble and unite them into a firm compact frame, so that by their combination and disposition they may form a solid fabric, sufficient to answer all the purposes for which it is intended. And, 3. To provide convenient accommodations for the officers and crew, as well as suitable apartments for the cargo, furniture, provisions, artillery, and ammunition.

The exterior figure of a ship may be divided into the bottom and upper works. The bottom, or quick-work, contains what is termed the hold, and which is under water when the ship is laden. The upper works, called also the dead work, comprehend that part which is usually above the water when the ship is laden. The figure of the bottom is therefore determined by the qualities which are necessary for the vessel, and conformable to the service for which she is proposed.

The limits of our design will not admit of a minute description and enumeration of all the pieces of timber which enter into the construction of a ship, nor of a particular description of their assemblage and union, or the manner in which they reciprocally contribute to the solidity of those floating citadels. It nevertheless appears necessary to give a general idea of the use, figure, and station of the principal pieces, to those who are entirely unacquainted with the subject. As our definitions will be greatly illustrated by the proper figures, we have annexed to this article a plate, which comprehends some of the most material draughts, as well as a representation of the principal pieces employed in naval architecture.

It is usual among shipwrights to delineate three several draughts, 1. The whole length of the ship is represented according to a side-view, perpendicular to the keel, and is termed the plane of elevation, or sheer draught. Plate 158, fig. 1. 2. The ship is exhibited according to an end view, and stripped of her planks, so as to present the outlines of the principal timbers; and this is properly termed the plane of projection, or the vertical plane of the timbers, (Pl. 159, fig. 1.) because it

shows the projection of their frames relatively to each other. 3. It is not sufficient to have the vertical curves of the bottom in different places, for a distinct idea of the horizontal curves is also equally necessary and useful: this is obtained by means of water-lines, traced upon what is called the horizontal plane, (pl. 158, fig. 2.) In this draught the curves of the transoms called the round-aft are also marked, and sometimes the breadth and thickness of the timbers.

The plane of elevation (fig. 1.) determines the length and depth of the keel; the difference of the draughts of water; the length and projection, or rake, of the stem and stern-post; the position of the midship-frame upon the keel, together with that of the principal frames afore and abaft; the load-water line; the wales; the dimensions and situations of the gun ports; the projection of the rails of the head and stern-gallery; with the stations of the masts and channels.

This draught, however, conveys no idea of the vertical curve of the ribs or timbers; for, as their projection will be only represented in a plane elevated upon the length of the keel, they will appear in this direction no otherwise than as straight lines. To perceive these curves accurately, they must be regarded in another point of view; which will represent their projection upon a vertical plane, supposed to cut the keel at right angles in the place where the ship is broadest. For, as all ships are broader near the middle of their length than towards the extremities, it is evident that the timbers are more extended in proportion. The most capacious of these represents what is called the midship-frame; and upon the area of this frame is delineated the projection of all the others.

Thus the plane of projection limits the different breadths of a ship in various points of her length, and exhibits the outline of the timbers respectively to each other as they are erected upon the keel. Accordingly, this draught ought to present a variety of sections of the ship in different places of her length, and always perpendicular to the surface of the water; so that the eye of the observer, when placed in what may be properly termed the axis of the ship, may perceive the several sections at one glance; that is to say, when looking full on the stem from before the ship, he shall discover the fore-timbers; and when looking from behind, directly on the stern, he shall perceive the form of the after-timbers. See in the Plate Stern, fig. 3. in which figure the sections of the inferior timbers are expressed by curved black lines drawn upon the area of the midship-frame, which is already described to be a plane elevated perpendicularly upon the keel at the extreme breadth of the vessel.

To form a just idea of this plane, therefore, we ought to suppose a ship resting upon the stocks, in the same position as when afloat upon the water. Thus a variety of black vertical lines may be drawn at equal distances upon the bottom, which is white, to form different outlines of the ship corresponding to the timbers within. It is to be observed, that the fashion of the inferior timbers must conform to the figure of the midship-frame, which is placed in the fullest part of the ship; and as the planes of all the other timbers diminish in a certain progression as they approach the stem and stern, they are properly delineated on the plane of the midship-frame, which also represents the depth of the keel and length of the midship-beam.

As the two sides of a ship ought to be exactly alike, is judged sufficient to represent the sections of the fore-part of the ship on the left side, and those in the after-part on the right side, so as to perceive all the sections, as well afore as abaft, upon one plane. See Plate 159, fig. 1.

However necessary it may be to understand precisely the vertical curves of the bottom, it is no less requisite to have a just idea of those which are horizontal.

The horizontal or floor-plane is that upon which the whole frame is erected, and will be more clearly understood by previously describing the water-lines and ribands of which it is composed.

When a ship floats upon the stream, it is evident that her upper works will be separated from the bottom by the surface of the water, which will accordingly describe an imaginary horizontal line upon the bottom from the stem to the stern-post.

The most elevated of those lines is termed the load water-line, which is supposed to be drawn by the surface of the water on the upper part of the bottom, when she is sufficiently laden for a sea-voyage. For if we suppose this surface a rule, and thereby describe a corresponding black line along the vessel's bottom, that line will be distinguished upon the bottom, which is white, and represent what is called the load water-line.

If the ship is lightened of any part of her lading, and preserves the same difference in her draught of water at the two ends; or, what is the same thing, if she is lightened so as to preserve the same equilibrium of the keel with regard to the surface of the water, it is evident that she will rise higher out of the water, so that the black line already described will be elevated above it; and another black line may be delineated upon the bottom, close to the surface of the water, which will exhibit a second water-line parallel to the first, but nearer the keel in proportion to the number of feet which the ship has risen.

Thus by lightening a ship gradually, and at the same time preserving the direction of her keel, or the angle which the keel makes with the surface of the water, a variety of water-lines may be drawn parallel to each other and to the load water-line.

The ribands are likewise of great utility in ship building; they are narrow and flexible planks placed on the bottom at different heights, so as to form a sort of mould for stationing the inferior timbers between the principal ones. They differ from the water-lines, inasmuch as the latter have only one curve, which is horizontal; whereas the ribands, besides their horizontal one, have a vertical curve. To convey a just idea of these curves, which cannot be represented on one draught at their full length, without an oblique section of the ship's length, it will be necessary to have recourse to two planes; that of the elevation, which exhibits their vertical curve; and to the floor plane, upon which the horizontal curve is expressed.

These different lines are extremely useful in exhibiting the various curves of a ship's bottom, that, as they are gradually diminished, their uniformity or irregularity may be discovered by the skilful artist.

The qualities required in a ship ought to determine the figure of the bottom. A ship of war, therefore, should be able to sail swiftly, and carry her lower tier of guns sufficiently out of the water; otherwise a small ship will have the advantage of a large one, inasmuch as the latter cannot open her lower battery in a fresh side-wind without being exposed to extreme danger by receiving a great quantity of water in at her ports between decks. A merchant-ship ought to contain a large cargo of merchant-goods, and be navigated with few hands:

and both should be able to carry sail firmly; steer well; drive little to leeward; and sustain the shocks of the sea without being violently strained.

The first thing to be established in the draught of a ship is her length; and as a ship of war, according to her rate, is furnished with a certain number of cannon, which are placed in battery on her decks, it is necessary that a sufficient distance should be left between their ports to work the guns with facility; and particularly to leave space enough between the foremost gun and the stem, and between the aftmost gun and the stern-post on each side, on account of the arching or inward curve of the ship toward her extremities.

When the length of a ship is determined, it is usual to fix her breadth by the dimensions of the midship-beam. On this occasion the shipwrights, for the most part, are conducted by rules founded on their own observation; for, having remarked, that some vessels, which by repeated experience have been found to answer all the purposes of navigation, have a certain breadth in proportion to their length, they have inferred that it would be improper to depart from this proportion: but as other ships have been constructed with different breadths, which were equally perfect, a variety of different general rules have been adopted by these artists; who are accordingly divided in their opinions about the breadth which ought to be assigned to a ship relatively with her length, whilst each one produces reasons and experience in support of his own standard. Those who would diminish the breadth, allege, 1. That a narrow vessel meets with less resistance in passing through the water: 2dly, That by increasing the length she will drive less to leeward: 3dly, That, according to this principle, the water-lines will be more conveniently formed to divide the fluid: 4thly, That a long and narrow ship will require less sail to advance swiftly; that her masts will be lower, and her rigging lighter; and, by consequence, the seamen less fatigued with managing the sails, &c. Those, on the contrary, who would enlarge the breadth, pretend, 1st, That this form is better fitted to preserve a good battery of guns: 2dly, That there will be more room to work the guns conveniently: 3dly, That, by carrying more sail, the ship will be enabled to run faster; or, that this quality will at least overbalance the advantage which the others have of more easily dividing the fluid: 4thly, That being broader at the load water-line, or place where the surface of the water describes a line round the bottom, they will admit of being very narrow on the floor, particularly towards the extremities: And, 5thly, That a broad vessel will more readily rise upon the waves than a narrow one. From such opposite principles has resulted that variety of standards adopted by different shipwrights.

It has been remarked above, that a ship of war must carry her lower tier of cannon high enough above the water, otherwise a great ship which cannot open her lower battery, when sailing with a fresh side-wind, may be taken by a small one that can make use of her cannon.

A ship should be duly poised, so as not to dive or pitch heavily, but go smooth and easy through the water, rising to the waves when they run high and the ship has reduced her sail to the storm; otherwise they will break aboard, and strain the decks or carry away the boats; the masts are likewise in great danger from the same cause.

A ship should sail well when large and before the wind, but chiefly close hauled, or with a side-wind, and her sails sharp-trimmed, and then not fall off to the leeward.

Now, the great difficulty lies in uniting so many different qualities in one ship; which seems to be nearly impossible: the whole art, therefore, consists in forming the body in such a manner that none of these qualities should be entirely destroyed, and in giving a preference to that which is chiefly required in the particular service for which the vessel is designed. We shall briefly show the possibility of uniting them all in one ship, that each of them may be easily discerned: when it happens otherwise, the fault must lie in the builder, who has not applied himself to study the fundamental rules and principles of his art.

To make a ship carry a good sail. A flat floor-timber, and somewhat long, or the lower futtock pretty round, a straight upper futtock, the top-timber to throw the breadth out aloft; at any rate, to carry her main breadth as high as the lower deck. Now, if the rigging be well adapted to such a body, and the upper works lightened as much as possible, so that they all concur to lower the centre of gravity, there will be no room to doubt of her carrying a good sail.

To make a ship steer well, and answer the helm quickly. If the fashion-pieces be well formed, the tuck, or spreading parts under the stern, carried pretty high, the midship-frame well forward, a considerable difference in the draught of water abaft more than afore, a great rake forward and none abaft, a snug quarter-deck and fore-castle; all these will make a ship steer well. A ship which sails well will certainly steer well.

To make a ship carry her guns well out of the water. A long floor-timber, and not of great rising; a very full midship-frame and low tuck, with light upper works.

To make a ship go smoothly through the water without pitching hard. A long keel, a long floor, not to rise too high afore and abaft; but the area or space continued in the fore-body, according to the respective weights they are to carry; all these are necessary to make a ship go smoothly through the water.

To make a ship keep a good wind, and drive little to the leeward. A good length by the keel; not too broad, but pretty deep in the hold, which will occasion her to have a short floor-timber and a great rising. As such a ship will meet with great resistance in the water going over the broadside, and little when going ahead, she will not fall much to the leeward.

Now, some builders imagine it is impossible to make a ship carry her guns well, bear a good sail, and be a prime sailer; because it would require a very full bottom to gain the first two qualities, whereas a sharp ship will answer better for the latter: but when it is considered that a full ship will carry a great deal more sail than a sharp one, a good artist may so form the body, as to have all these three good qualities, and also steer well.

We shall now proceed to describe the principal pieces of which a ship is composed, and to explain the principal draughts used in the construction thereof.

As the several lines exhibited in the planes of elevation, projection, &c. will be rendered more intelligible by a previous account of those pieces, it may not be improper to begin with reciting their names, and giving a summary description of their uses and stations. They are for the most part represented according to the order of their dispo-

sition in that part of Plate 156 which is termed pieces of the hull.

A. The pieces which compose the keel, to be securely bolted together, and clinched. B. The stern-post, which is tenanted into the keel, and connected to it by a knee, G. It supports the rudder, and unites the sides of the ship abaft. C. The stem, which is composed of two pieces scarfed together: it is an arching piece of timber, into which the ship's sides are united forwards. D. The beams, which are used to support the decks, and confine the sides to their proper distance. E. The false post, which serves to augment the breadth of the stern-post, being also tenanted into the keel. F. The knees which connect the beams to the sides. G. The knee of the stern-post, which unites it to the keel. H. The apron, in two pieces: it is fayed on the inside of the stem, to support the scarf thereof; for which reason the scarf of the former must be at some distance from that of the latter. I. The stemson, in two pieces, to reinforce the scarf of the apron. K. The wing-transom: it is fayed across the stem-post, and bolted to the head of it, having its two ends let into the fashion-pieces. L. The deck-transom, parallel to the wing-transom, and secured in the same manner. MN. The lower transoms. O. The fashion-piece on one side; the heel of it is connected with the dead-wood, and the head is secured to the wing-transom. P. The top-timbers, or upper parts of the fashion-pieces. Q. The knees, which fashion the transoms to the ship's side. R. The breast-hooks, in the hold; they are fayed across the stem, to strengthen the fore-part of the ship. S. The breast-hooks of the deck: they are placed immediately above the former, and used for the same purposes. T. The rudder, which is joined to the stern-post by hinges, and serves to direct the ship's course. U. The floor-timbers; they are laid across the keel, to which they are firmly bolted. V. The lower futtocks, and, W. The top-timbers, which are all united to the floor-timbers, forming a frame that reaches from the keel to the top of the side. X. The pieces which compose the kelson: they are scarfed together like the keel-pieces, and placed over the middle of the floor-timbers, upon each of which they are scored about an inch and a half, as exhibited by the notches. Y. The several pieces of the knee of the head; the lower part of which is fayed to the stem; the heel being scarfed to the fore-foot. Z. The cheeks of the head or knees, which connect the head to the bows on each side. &. The standard of the head, which fastens it to the stem. *a*. The cat-heads, one of which lies on each bow, projecting outwards like the arm of a crane. They are used to draw the anchors up to the top of the side without injuring the bow. *b*. The bits, to which the cable is fastened when the ship rides at anchor. *c*. The false post, in two pieces, fayed to the forepart of the stern-post. *d*. The side-counter-timbers, which terminate the ship abaft within the quarter-gallery. *e*, *e*. Two pieces of dead-wood, one afore and another abaft, fayed on the keel.

In vessels of war, the general dimensions are established by authority of officers appointed by the government to superintend the building of ships. In the merchant-service, the extreme breadth, length of the keel, depth in the hold, height between decks and in the waste, are agreed on by contract; and from these dimensions the shipwright is to form a draught suitable to the trade for which the ship is designed.

In projecting the draught of a vessel of war, the first article to be considered is her length. As all ships are much longer above than below, it is also necessary to distinguish the precise part of her height from which her length is taken: this is usually the lower gun-deck, or the load water-line. It has been already observed, that water-lines are described longitudinally on a ship's bottom by the surface of the water in which she floats, and that the line which determines her depth under the water is usually termed the load water-line. In this draught it will be particularly necessary to leave sufficient distance between the ports.

The next object is to establish the breadth by the midship beam. Although there is great difference of opinion about proportioning the breadth to the length, yet it is most usual to conform to the dimensions of ships of the same rate. After the dimensions of the breadth and length are determined, the depth of the hold must be fixed, which is generally half the breadth: but the form of the body should be considered on this occasion: for a flat floor will require less depth in the hold than a sharp one. The distance between the decks must also be settled.

We may then proceed to fix the length of the keel, by which we shall be enabled to judge of the rake of the stem and stern-post. The rake is known to be the projection of the ship at the height of the stem and stern-post beyond the ends of the keel afore and abaft, or the angle by which the length is increased as the fabric rises. To these we may also add the height of the stem and wing-transom.

After these dimensions are settled, the timbers may be considered which form the sides of the ship. A frame of timbers, which appears to be one continued piece, is composed of one floor-timber, U, whose arms branch outward to both sides of the ship; two or three futtocks, VV; and a top-timber, W. The futtocks are connected to the upper arms of the floor-timbers on each side of the ship, and serve to prolong the timber in a vertical direction: and the top-timbers are placed at the upper part of the futtocks for the same purpose. All these being united, and secured by cross-bars, or a circular inclosure, which is called a frame of timbers. And as a ship is much broader at the middle than at the extremities, the arms of the floor-timber will form a very obtuse angle at the extreme breadth: but this angle decreases in proportion to the distance of the timbers from the midship-frame, so that the foremost and aftmost ones will form a very acute angle. Floor-timbers of the latter sort are usually called crutches.

Shipwrights differ extremely in determining the station of the midship-frame; some placing it at the middle of the ship's length, and others further forward. They who place it before the middle allege, that if a ship is full forwards, she will meet with no resistance after she has opened a column of water; and that the water so displaced will easily unite abaft, and by that means force the ship forward; besides having more power on the rudder, in proportion to its distance from the centre of gravity: this also comes nearer the form of fishes, which should seem the most advantageous for dividing the fluid.

When the rising of the midship-floor-timber is decided, we may then proceed to describe the rising-line of the floor, on the stern-post abaft, and on the stem afore.

The height of the lower-deck is the next thing to be considered: it is determined in the middle by the depth of the hold; and some builders make

it no higher than the stem; but they raise it abaft as much above its height in the middle as the load water-mark, or draught of water abaft, exceeds that afore. With regard to the height between decks, it is altogether arbitrary, and must be determined by the rate of the ship and the service she is designed for.

It is also necessary to remember the sheer of the wales, and to give them a proper hanging; because the beauty and stateliness of a ship greatly depend upon their figure and curve, which, if properly drawn, will make her appear airy and graceful on the water.

We come now to consider the upper works, and all that is above water, called the dead-work: and here the ship must be narrower, so that all the weight lying above the load water-line will thereby be brought nearer the middle of the breadth, and of course the ship will be less strained by the working of her guns, &c. But although some advantages are acquired by diminishing the breadth, above water, we must be careful not to narrow her too much; as there must be sufficient room left on the upper deck for the guns to recoil. The security of the masts should likewise be remembered, which requires sufficient breadth to spread the shrouds. A deficiency of this sort may indeed be in some measure supplied by enlarging the breadth of the channels.

We come to explain the sheer-draught, or plane of elevation of a sixty-gun ship; wherein we have been attentive to make the same letters refer to the same objects, as in the explanation of the pieces, as above; at least when the same objects are in both figures. See Plate 158.

AA, fig. 1. Is the keel, whose upper edge is prolonged by the dotted line *p q*, upon the extremities of which are erected perpendiculars which determine the height of the wing-transom K, and the length of the gun deck K C. A B, The stern-post. A C, The stem. D D, The quarter gallery, with its windows. E F, The quarter-pieces, which limit the stern on each side. F, The taffarel, or upper piece of the stern. F G, Profile of the stern, with its galleries. H, The gun-ports. I, the channels, with their dead-eyes and chain-plates. K, the wing-transom. K G, The counter. L B, The deck-transom. M N O, The first, second, and third transoms, of which O *k* is the third or lowest. *m* O L P, The direction of the fashion-piece, having its breadth canted aft towards the stern. Q R, The main skeeds, for hoisting in the boats clear of the ship's side. L Q Z, The main-wale, with its sheer afore and abaft. D R X, The channel-wales, parallel to the main-wale. S U S, the sheer-rail parallel to the wales. T *t*, The rudder. A t F, The rake of the stern. V W V, the waist-rail. P *i i*, The drift-rails abaft; and *i* a, The drift-rails forward. T U C, The water-line. X X, The rails of the head. Y, The knee of the head, or cut-water. Z Z, The cheeks of the head. a a, The cat-head. M ⊕ C, The rising line of the floor. *k u* C, The cutting-down line, which limits the thickness of all the floor timbers, and likewise the height of the dead wood afore and abaft. ⊕ *u* U W, The midship-frame. *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, The frames or timbers in the fore-body of the ship, *i. e.* before the midship-frame. 1, 2, 3, 4, 5, 6, 7, 8, 9, The timbers in the after-body, or which are erected abaft the midship-frame.

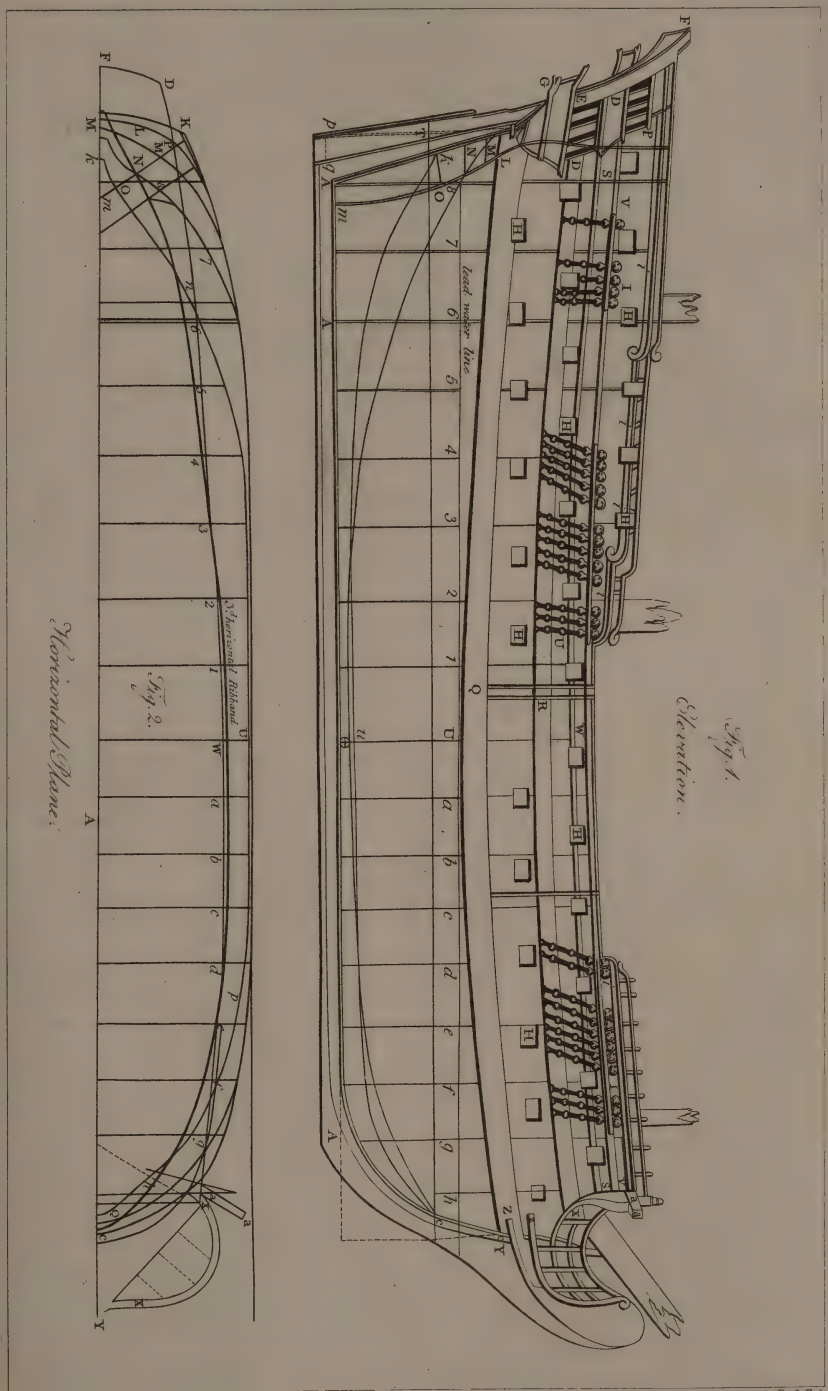
As the eye of a spectator is supposed in this projection to view the ship's side in a line perpendicular to the plane of elevation, it is evident that the convexity will vanish, like that of a cylinder or globe, when viewed at a considerable distance; and that the frames will consequently be represented by straight lines, except the fashion-piece abaft and the knuckle-timber forward.

It has been already observed, that the plane of projection may be defined a vertical delineation of the curves of the timbers upon the plane of the midship-frame, which is perpendicular to that of the elevation. It is necessary to observe here, that the various methods by which these curves are described, are equally mechanical and arbitrary. In the latter sense, they are calculated to make a ship fuller or narrower, according to the service for which she is designed; and in the former they are drawn according to those rules which the artist has been implicitly taught to follow, or which his fancy or judgment has esteemed the most accurate and convenient. They are generally composed of several arches of a circle, reconciled together by moulds framed for that purpose. The radii of these arches, therefore, are of different lengths, according to the breadth of the ship in the place where such arches are swept; and they are expressed on the plane of projection either by horizontal or perpendicular lines: the radii of the breadth-sweeps being always in the former, and the radii of the floor-sweeps in the latter direction. These two arches are joined by a third, which coincides with both, without intersecting either. The curve of the top-timber is either formed by a mould which corresponds to the arch of the breadth-sweep, or by another sweep whose centre and radius are without the plane of projection. The breadth of the ship, at every top-timber, is limited by a horizontal line drawn on the floor-plane, called the half-breadth of the top timbers. The extreme breadth is also determined by another horizontal line on the floor-plane; and the lines of half-breadth are thus mutually transferable, from the projection and floor-planes, to each other.

The necessary data by which the curves of the timbers are delineated, then, are the perpendicular height from the keel; the main, or principal breadth; and the top-timber breadth: for as a ship is much broader near the middle of her length than towards the end, so she is broader in the middle of her height than above and below; and this latter difference of breadth is continued throughout every point of her length. The main breadth of each frame of timbers is therefore the ship's breadth nearly in the middle of her height in that part: and the top-timber breadth is the line of her breadth near the upper ends of each timber. It has been already observed, that as both sides of a ship are alike, the artificers only draw one side, from which both sides of the ship are built: therefore the timbers abaft the midship-frame are exhibited on one side of the plane of projection, and the timbers before it on the other.

Plane of Projection.

Fig. 1. pl. 159. A, The keel. B C, The line which expresses the upper edge of the keel, from which the height of each timber and height of its different breadths are measured. B D, and C E Perpendiculars raised on the line B C, to limit the ship's extreme breadth and height amidships; or, in other words, to limit the breadth



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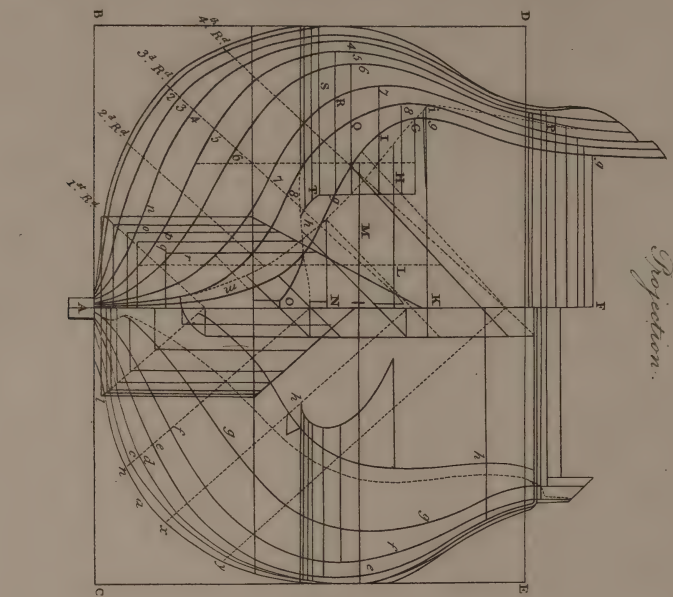


Fig. 1. Projection.

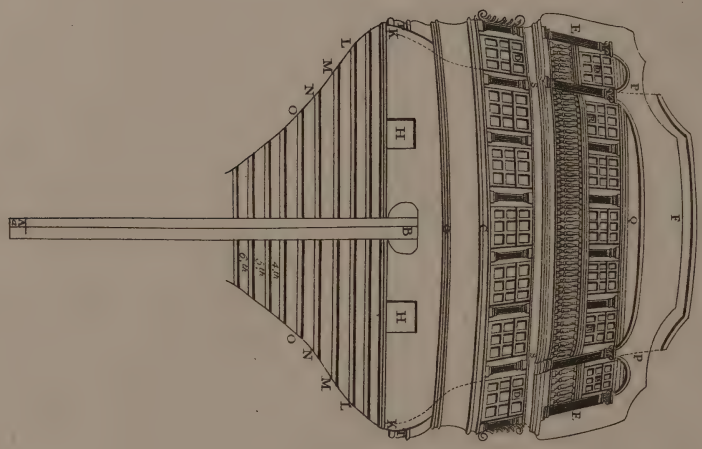


Fig. 2.

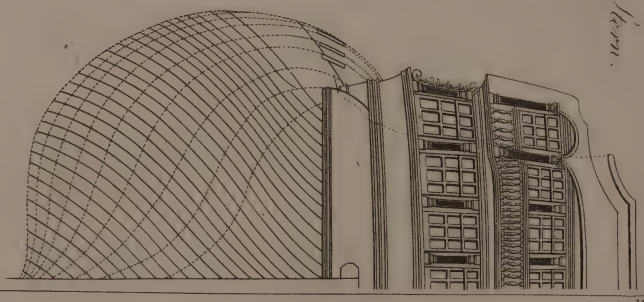


Fig. 3. Stern.

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and height of the midship-frame. A F, A perpendicular erected from the middle of the keel to bisect the line of the ship's breadth in two equal parts. F 9, the half-breadth line of the aftmost top-timber; being the uppermost horizontal line in this figure.

Note, The seven lines parallel to and immediately under this, on the right side of the line A F, are all top-timber half-breadths, abaft the midship-frame; the lowest of which coincides with the horizontal line D E.

The parallel horizontal lines nearly opposite to these, on the left side of the line A F, represent the top-timber half-breadths in the fore body, or the half-breadths of the top-timbers before the midship-frame.

G, H, I, Q, R, S, T, The radii of the breadth-sweeps abaft the midship-frame; those of the breadth-sweeps in the fore-body, or before the midship-frame, are directly opposite on the right side.

⊕ A show the midship-frame, from the extreme breadth downwards.

1, 2, 3, 4, 5, 6, 7, 8, 9, The outlines of the timbers abaft the midship-frame, in different parts of their height. *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, The outlines of the timbers before the midship-frame, in different parts of their height, *h* being the foremost or knuckle-timber. K *i*, the wing-transom, whose ends rest upon the fashion-piece. L, The deck-transom, parallel to and under the wing-transom. M N O, the lower transoms, of which O *k* is the third and lowest. *m k* F, The dotted line, which expresses the figure of the fashion-piece, without being canted aft. P, The upper-part, or top-timber of the fashion-piece. *n*, *o*, *p*, *q*, *r*, *s*, The radii of the floor-sweeps, abaft the midship-frame; those before the midship-frame are on the opposite side of the line A F, to which they are all parallel.

1st R^{d}, 2d R^{d}, 3d R^{d}, 4th R^{d}, the diagonal ribands abaft the midships *t*, *u*, *x*, *y*. The same ribands expressed in the fore-body.

It has been remarked above, that the horizontal plane is composed of water-lines and ribands; it also contains the main and top-timber breadth lines, or the longitudinal lines by which the main-breadth and top-timber breadth are limited in every point of the ship's length. The horizontal curve of the transoms and harpins are also represented therein; together with the planes of the principal timbers, the cant of the fashion-piece, the length of the rake afore and abaft, the projection of the cat-heads, and the curve of the upper rail of the head, to which the curves of the lower ones are usually parallel.

Horizontal Plane.

B A C, Fig. 2, The line of the ship's length, passing through the middle of the stem and stern-post. B, The upper end of the stern-post. C, The upper end of the stem. B F, The length of the rake abaft. D W X, The top-timber-breadth line, or the line which limits the breadth of each top-timber.

D F, The breadth of the aftmost timber at the taffarel. B K, The wing-transom. B L P, The horizontal curve of the deck-transom. M M, The horizontal curve, or round aft, of the first transom. M N, The horizontal curve of the second transom: it is prolonged into a water-line, N 8 7. *k* O, The horizontal curve of the third transom, which is also prolonged into another water-line, O, *n*, U, *p*, Q. *m* O P, The plane of the fashion-piece, as canted aft. ⊕ W U, The plane of the midship-frame. *a*, *b*, *c*, *d*, *e*, *f*, *h*, The planes of the timbers before the midship-frame. 1, 2, 3, 4, 5, 6, 7, 8, 9, The planes of the timbers abaft the midship-frame. X X, The figure of the upper-rail of the head. C Y, The projection of the knee of the head.

The third horizontal riband is marked on the plate. a a, The projection of the cat-head.

Thus we have endeavoured briefly to explain the nature and uses of the principal draughts used in the construction of a ship, which reciprocally correspond with each other in the dimensions of length, breadth, and depth. Thus the plane of elevation is exactly of the same length with the horizontal or floor-plane. The several breadths of the timbers in the floor-plane, and that of the projection, are mutually transferable; and the real height of the timbers in the projection exactly conforms to their height in the elevation. Thus, let it be required to transfer the height of the wing-transom from the elevation to the projection:

Extend the compasses from the point K, in the elevation, down to the dotted line prolonged from the upper edge of the keel, and setting the other foot in the point *p*, then shall the line K *p* be the perpendicular height in the wing-transom: transfer this from the middle of the line B A C, in the projection, to the point K in the perpendicular A F, then will A K be the height of the wing-transom in the plane of projection: and thus the height of all the transoms may be laid from the former upon the latter.

Again: let it be required to transfer the main-breadth of the midship-frame from the projection to the horizontal plane: set one foot of the compasses in the point ⊕ on the perpendicular C E, and extend the other along the main-breadth-sweep ⊕ G, till it touches the perpendicular A F parallel to C E: lay this distance upon the horizontal plane from the point *u* in the line of the ship's length, B A C, along the plane of the midship-frame to the point ⊕; so shall the line ⊙ W U be the breadth of the midship-frame on the horizontal plane.

Thus also the top-timber-breadth, or the distance of each top-timber from the middle of the ship's breadth, may be in the same manner transferred, by extending the compasses from the line B A C, in the horizontal plane, to the top-timber-breadth line, upon any particular timber, as 1, 2, 3, &c. which will give its proper dimensions thereon.

In the same manner the breadths of all the timbers may be laid from the projection to the horizontal plane, and, *vice versa*, from that to the projection. Thus the height of each timber may also be transferred from the elevation to the projection, &c.

The principal utility of these draughts, therefore, is to exhibit the various curves of the ship's body, and of the pieces of which it is framed, in different points of view, which are either transverse or longitudinal, and will accordingly present them in very different directions. Thus the horizontal curves of the transoms and water-lines are represented on the floor-plane, all of which are nearly straight lines in the elevation and projection; and thus the vertical curves of the timbers are all exhibited on the projection, although they appear as straight lines in the elevation and floor-plane.

SHIP-BUILDING.

Part II.—Of constructing ships.

The pieces by which this complicated machine, a ship, is framed, are joined together in various places by Scarfing, Rabitting, Tenanting, and Scoring. See those articles.

During the construction of a ship, she is supported in the dock, or upon a wharf, by a number of solid blocks of timber placed at equal distances from, and parallel to, each other; she is then said to be on the stocks.

The first piece of timber laid upon the blocks is generally the keel: we say generally, because, of late, a different method has been adopted in some of the royal dock-yards, by beginning with the floor-timbers; the artists having found that the keel is often apt to rot during the long period of building a large ship of war. The pieces of the keel are scarfed together, and bolted, forming one entire piece, A A, which constitutes the length of the vessel below. At one extremity of the keel is erected the stem. It is a strong piece of timber incurvated nearly into a circular arch, or, according to the technical term, compassing, so as to project outwards at the upper end, forming what is called the rake forward. In small vessels this is framed of one piece; but in large ships it is composed of several pieces scarfed and bolted together, as expressed in the explanation of fig. 2. pl. 156. and in those terms separately. At the other extremity of the keel is elevated the stern-post, which is always of one entire straight piece. The heel of it is let into a mortise in the keel, and having its upper end to hang outwards, making an obtuse angle with the keel, like that of the stem: this projection is called the rake abaft. The stern-post, which ought to support the stern, contains the iron-work, or hinges of the rudder, which are called googings, and unites the lower parts of the ship's sides abaft. See the connection of those pieces in the elevation, fig. 1. pl. 158.

Towards the upper end of the stern-post, and at right angles with its length, is fixed the middle of the wing-transom, where it is firmly bolted. Under this is placed another piece parallel thereto, and called the deck-transom, upon which the after-end of the lower deck is supported. Parallel to the deck-transom, and at a proper distance under it, another piece is fixed to the stern-post, called the first transom; all of which serve to connect the stern-post to the fashion-pieces. Two more transoms, called the second and third, are also placed under these, being likewise attached to the fashion-pieces, into which the extremities of all the transoms are let. The fashion-pieces are formed like the other timbers of the ship, and have their heels resting on the upper part of the kelson, at the after-extremity of the floor-ribands.

All these pieces, viz. the transoms, the fashion-pieces, and their top-timbers, being strongly united into one frame, are elevated upon the stern-post; and the whole forms the structure of the stern, upon which the galleries and windows, with their ornaments, are afterwards built.

The stem and stern-post being thus elevated upon the keel, to which they are securely connected by knees and arched pieces of timber bolted to both; and the keel being raised at its two extremities by pieces of dead wood, the midship floor-timber is placed across the keel, whereto it is bolted through the middle. The floor-timbers before and abaft the midship-frame are then stationed in their proper places upon the keel; after which the kelson, which, like the keel, is composed of several pieces scarfed together, is fixed across the middle of the floor-timbers, to which it is attached by bolts driven through the keel, and clinched on the upper part of the kelson. The futtocks are then raised upon the floor-timbers, and the hawse-pieces erected upon the cant-timbers in the fore-part of the ship. The top-timbers on each side are next attached to the head of the futtocks, as already explained in Part I. The frames of the principal timbers being thus completed, are supported by ribands.

The ribs of the ship being now stationed, they proceed to fix on the planks, of which the wales are the principal, being much thicker and stronger than the rest. The harpins, which may be considered as a continuation of the wales at their fore-ends, are fixed across the hawse-pieces, and surround the fore-part of the ship. The planks that inclose the ship's sides are then brought about the timbers; and the clamps, which are of equal thickness with the wales, fixed opposite to the wales within the ship: these are used to support the ends of the beams, and accordingly stretch from one end of the ship to the other. The thick stuff, or strong planks of the bottom within-board, are then placed opposite to the several scarfs of the timbers, to reinforce them throughout the ship's length. The planks employed to line the ship, called the ceiling, or foot-waling, is next fitted in the intervals between the thick-stuff of the hold. The beams are afterwards laid across the ship to support the decks, and are connected to the side by lodging and hanging knees; the former of which are exhibited in their proper stations in Plate 158. F; and the hanging ones, together with the breadth, thickness, and position of the keel, floor-timbers, futtocks, top-timbers, wales, clamps, thick-stuff, planks within and without, beams, decks, &c. are seen in the midship frame.

The cable bits being next erected, the carlings*, and ledges†, which are represented in Plate 158. are disposed between the beams to strengthen the deck. The water ways are then laid on the ends of the beams throughout the ship's length, and the spirketting fixed close above them. The upper deck is then planked, and the string placed under the gunnel or plansheer in the waist.

They proceed next to plank the quarter-deck and forecastle, and to fix the partners of the masts and capsterns with the coamings of the hatches. The breast-hooks are then bolted across the stem and bow within board; the step of the fore-mast placed on the kelson; and the riders fayed on the inside of the timbers to reinforce the sides in different places of the ship's length. The pointers, if any, are afterwards fixed across the hold diagonally to support the beams; and the crotches stationed in the after-hold to unite the half-timbers. The steps of the main-mast and capsterns are next placed; the planks of the lower-decks

* These are short pieces of timber ranging fore and aft, from one of the deck-beams to another, into which their ends are scored: they are used to sustain and fortify the smaller beams of the ship.

† These are certain small pieces of timber placed athwart-ships, under the decks of a ship, in the interval between the beams; as exhibited in the representation of the deck, Plate 158.

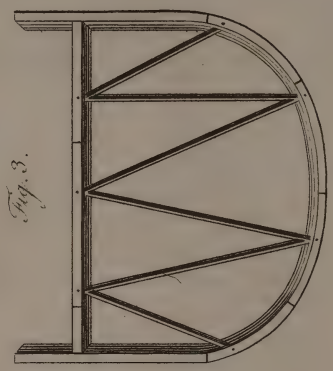


Fig. 3.

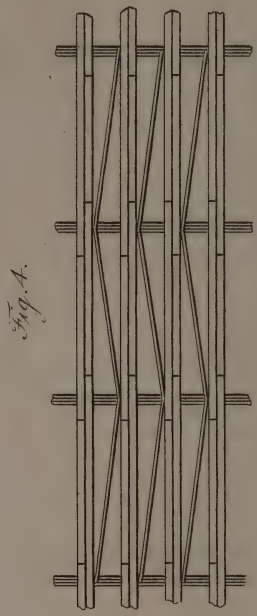


Fig. 4.

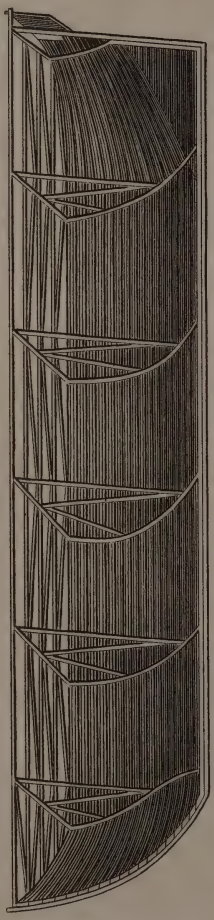


Fig. 1.

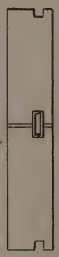


Fig. 5.



Fig. 2.

Mudlow Sc. Rayfield Ct.

London, Published by Sherwood & Cº Paternoster Row, Novr 1, 1812.

and orlop laid; the navel hoods fayed on the hawse-holes; and the knee of the head, or cut-water, connected to the stem. The figure of the head is then erected, and the trail-board and cheeks are fixed on the sides of the knee.

The taffarel and quarter-pieces, which terminate the ship abaft, the former above and the latter on each side, are then disposed; and the stern and quarter galleries framed and supported by their brackets. The pumps, with their well, are next fixed in the hold; the limber-boards laid on each side of the kelson; and the garboard strake fixed on the ship's bottom next to the keel without.

The hull being thus fabricated, they proceed to separate the apartments by bulk-heads, or partitions; to frame the port-lids; to fix the cat-heads and chess-tress; to form the hatchways and scuttles, and fit them with proper covers or gratings. They next fix the ladders whereby to mount or descend the different hatchways; and build the manger on the lower deck, to carry off the water that runs in at the hawse-holes when the ship rides at anchor in a sea. The bread-room and magazines are then lined; and the gunnel, rails, and gangways, fixed on the upper part of the ship. The cleats, kevels, and ranges, by which the ropes are fastened, are afterwards bolted or nailed to the sides in different places.

The rudder, being fitted with its irons, is next hung to the stern-post; and the tiller, or bar, by which it is managed, let into a mortise at its upper-end. The scuppers, or leaden tubes, that carry the water off from the decks, are then placed in holes cut through the ship's sides; and the standards bolted to the beams and sides above the decks to which they belong. The poop-lanthorns are last fixed upon their cranes over the stern; and the bilge-ways, or cradles, placed under the bottom, to conduct the ship steadily into the water whilst launching.

As the various pieces which have been mentioned above are explained at large in their proper places, it would have been superfluous to have entered into a more particular description of them here.

The art of ship-building being of the first importance in a commercial nation, many ingenious men have directed their attention towards its improvement. Among others Mr. John Whitley Boswell proposes a new method of construction, of which, as we think highly, we present the following account, in the words of the specification of Mr. Boswell's patent, dated May 20th, 1802.

"My new method of building or constructing vessels for navigation differs principally from the old method in the placing timbers or ribs lengthwise or horizontally instead of vertically, by the means hereinafter recited; and in using a framing, consisting of a series of triangles hereafter described, in such parts of the vessel, and in such cases, as are there mentioned, either to produce a greater strength with the same quantity of materials, or an equal strength for a smaller quantity. By which it is expected much less crooked timber need be used than is now employed, and the danger of using pieces cut across the grain proportionally diminished.

"The said new method of building vessels for navigation is contained in the following directions for constructing a vessel in this manner.

"First, having determined on the size and shape of the vessel intended to be built, it is to be supposed to be divided by transverse vertical sections at right angles to the keel, at certain distances from each other (see longitudinal section, Fig. 1. Plate 160), which distances must depend chiefly on the strength of the materials to be used in constructing the vessel, requiring to be less when the materials are slighter, and admitting of a greater extent when the materials are stronger; therefore there will be fewer of those sections required in the latter case than in the first, but in general they should not be fewer than four. Secondly, having ascertained the number and places of those sections, a frame must be made of the shape of each section externally, so that the upper part of it may be of the breadth of that part of the deck under which it is to stand, and its sides and bottom may be moulded according to the true shape of the sides and bottom of said section; the more particular construction of which said frames is to be described hereafter. Thirdly, when said frames are formed, each of them is to be erected in the place corresponding to the section of that part of the vessel it is meant to represent as aforesaid, and to be there supported by temporary props or stays, so that the workmen may get at every part of them; the stem-post and stern-post also to be erected in like manner in their proper places. Fourthly, timbers or ribs are then to be laid horizontally from frame to frame, at their outward surfaces, extending from stem-post to stern-post, and to be fastened to the frames and posts by bolts or otherwise; which horizontal ribs are each to be moulded according to the shape of that part of the vessel where it is to lie, and to be of that thickness which the size of the vessel, and the distance of said transverse frames from each other may require, so as to produce sufficient strength. These horizontal ribs are each to be fayed at its extremity into the next which joins it at either end, are to have those junctures near to the frames, and to extend in at least every second case, with a single piece of timber, a foot or two beyond the two frames to which it is to be fastened; and where timbers can be got to extend to three or more frames, they are to be preferred, see Fig. 2, which represents a part of the side of the vessel so constructed. If it should be thought fit to place the said horizontal ribs so that intervals should be between them, a method should be followed in building which will be described more at large hereafter; but should they be placed as close to each other as it is usual to place the vertical ribs in the common method of building, then the next operation should be to fasten planking to them, outside and inside, with trennels or otherwise, at right angles, to the direction of the ribs, or vertically; and if any inconvenience should arise or be apprehended from the vertical position of the outside plank, a sheathing of board may be fastened over it in the usual manner. Wherever the curvature of the bottom of the vessel will admit it, the outside planking should be made to pass between the bottom ribs and the keel; and where the shape will not admit of this (as near the stern), I recommend that the inside planks be put on first after the ribs, and their lower extremities made fast to the kelson, or a piece to be for this purpose bolted to the keel inside; and that the outside planks be rabbetted, and firmly fastened to the keel, as much below this as will give them a firm gripe in the keel. It will facilitate this last operation if two or three of the

said horizontal ribs, next the stern, close to the keel, are not fastened up finally till the inside planks are fastened at the bottom in this part as here directed.

" Of forming the Head and Stern.

" In forming the head, where the curvature approaches near to a circular form at the stem-post, the horizontal ribs may there be joined to curved pieces, like breast-hooks, bolted to the stem-post; and where the angle required is too sharp to admit of this, they may be bolted, or otherwise fastened, to the stem-post, and may be farther secured, if necessary, to an internal piece, to run in the direction of the stem-post, and be well fastened to it. These last directions will also apply to the formation of the stern.

" Of the Keel and Kelson.

" The keel should either be put on after the outside planking was laid in all parts of the bottom, where the curvature was not too great, over the place of the keel; or, if the keel is desired to be first laid down, the horizontal ribs should be supported in such a manner above it, by pieces of wood, to be afterwards removed, as to admit the part of the planking, before directed, to be passed between them and the keel.

The kelson should be placed along over the inside plank, in all parts where it will admit of being so, and be bolted down through it and the horizontal ribs, directly underneath to the keel.

" Farther Description of the transverse Frames.

" The transverse vertical frames (before described as to their external shape only) should be formed thus: their sides and bottoms should be made of pieces sided and moulded like the vertical ribs, in the common method of building ships, in that part of the vessel they are intended to stand; more than three series of timbers, side by side, will be unnecessary to form them, and not less than two should be used: in either case, the joints endwise of one series should be arranged so as not to be opposite the joints of another series in the same frame. The part under the deck should be formed of straight beams, or of beams of the small curvature, usually given to the deck. The different series of pieces in the same frame should be fastened sidewise to each other by bolts or trennels. And farther, to strengthen said frames, and by them give great strength to the whole ship, I direct that pieces be passed obliquely from the horizontal beams of said frames under the deck to the sides and bottom of said frames, so as to divide the whole of the internal space or plane of the frames into triangles. Which last I recommend, because I have found that in a triangular frame any strain at or near the angle spends its force in tending to rend asunder the piece opposite in the direction of its fibres, or lengthwise, in which direction it can bear a much greater strain than across the grain; and that, in a frame formed of a number of triangles, no strain can be given to it in the direction of its plain, which will not fall either directly or indirectly in one or more angles, and thereby have the effect already mentioned. These oblique pieces may be let into the subtance of the frames, and be fastened by bolts passing through the frames and them, and may be farther secured by iron bands or iron straps, if judged necessary, to the sides and top of the frame. The sides of the frames should be made to extend a foot or two above the deck-beams for small vessels, and a greater height for large, for the convenience of forming the parts of the sides of the vessel at and above the deck, one of those frames, as intended for the midship-frame, is drawn in fig. 3.

" To build with Intervals between the horizontal Ribs.

" When it is desired to leave intervals between the horizontal ribs, the method of proceeding should be as follows. It is best that two ribs should be brought all along close together at the side of each interval, for the better strengthening of the junctures at their extremities. Having fixed on the intervals to be left between any two pair of ribs, let said ribs be formed or moulded at least so much thicker, from in to out, than would have been necessary had they lain close together, that the square of their whole thickness may be equal to the sum of the thickness of as many ribs (each of the same breadth sidewise as the said pair) as would fill up said interval, added to their own breadth. Then diagonal pieces should be placed across each interval, from the side of each transverse frame to that of the next, to which they should be fastened so as to form the whole surface into a series of triangles (the advantage of which has been already shewn), after which planking should be laid on across the direction of said ribs, or vertically, of sufficient strength to bear the pressure of water between each two pair of ribs, at the depth beneath the surface of the water, where it is to lie. Outside of which there should be placed a second coat of planking in the direction of the ribs, or across the direction of the first, to prevent the danger which might arise of the oakum working out from the seams of the first planking, on account of the great distance that must be between the trennels in many parts in this last method of building. A part of the side of a vessel, formed in the manner last described, before the planks are put on, is represented in Fig. 4.

" Of forming the Decks.

" The decks of vessels, built on this my new method, should be formed in somewhat a similar manner to this last described for the sides, that is to say; beams or pieces of timber, similar to the ribs, should be laid lengthwise over the upper part of the transverse frames, and fastened to them, with intervals between each pair, across which intervals other pieces should be laid diagonally from frame to frame, and fastened with trennels, or otherwise, to said frames. Smaller pieces should then be either placed across the direction of the beams, and let into the substance thereof, over which the planking should be laid lengthwise; or else the smaller pieces should be laid in the direction of the beams, from frame to frame, over, or let into, the diagonal pieces, across which the planking should be laid at right angles, to the direction of the beams; and this last method I prefer, as it gives an opportunity of dovetailing, or otherwise fastening, the ends of the planks to pieces, to be well fastened for that purpose to the sides of the vessel, from frame to frame, horizontally under the deck; by which it is conceived the sides would be united more firmly to the deck. I would also recommend that the upper cross parts of the frame be let an inch or two into the substance of said longitudinal beams. When a vessel is required to be built

of so large a size that it will require plank of such a great thickness as could not be bent in a vertical position without a degree of labour and expense which would too much counterbalance the advantage of leaving out vertical ribs altogether; then, in this case, I direct that the horizontal ribs may have large intervals left between them, and be made so much thicker from in to out as the directions before given for building with intervals between the horizontal ribs would require them to be; that then the diagonal pieces are to be firmly fixed in the manner and position before directed: after which I direct that small vertical ribs be fastened over the horizontal ribs, with such intervals between them as their thickness, and the thickness of the plank to be used will allow; over which vertical ribs the planking is to be made fast with trennels, or otherwise horizontally, or fore and aft, in the usual position and manner; and this last method of building may be farther strengthened, if thought fit, by fastening diagonal pieces between the vertical ribs also in a similar manner to that already herein directed for those to be used with the horizontal ribs.

"It is my intent, that every part and thing of and about the vessel not described here should be made or done according to the method in general use for doing such things, or forming such parts; and that knees and beams across under the deck may be put in if thought proper, and hanging knees and riders, though at present I do not think them necessary; and that the principle of building here described may be extended to build vessels with two or more decks, and is applicable to the building of all vessels, from a boat to a first-rate man of war. It is necessary to mention, that though I do not recommend it, the transverse frames herein recited may be also used in building ships (if of a smaller size) to support horizontal ribs, without being divided into triangles, and without having any strengthening pins passing across their planes, but merely consisting of external frames, of the shapes of the different sections of the vessel, as before mentioned, and that they wholly or partly may be made of cast or wrought iron, if it is preferred by other builders to do so.

"The advantages which I expect this method of building ships will have above that in common use, are, first, that it will produce great additional strength by the transverse frames and the horizontal ribs; the first from the great power given them by the triangular frames; and the second by giving their power of support in the direction where the greatest strain is, or lengthwise; by which it is conceived vessels so built will be entirely prevented from hogging (as it is termed), or having broken backs. Secondly, a vast proportion of crooked timber may be saved, which, for large vessels particularly, is much more difficult to be procured than the straight, as, by the horizontal position of the ribs, in most parts straight timber, or timber nearly straight, may be used for their formation, except at the head and stern, by which also the use of timber cut across the grain may be proportionally diminished. Thirdly, much knee-timber may be saved, which the triangular framing on the decks will render unnecessary. And, fourthly, when the method described of building ships, with the intervals between the horizontal ribs, is used, it is conceived a great quantity of timber of all kinds, both straight and crooked, may be saved, without diminishing the strength or security of vessels so built. Fifthly, even in the last method of building directed, it is conceived there will be a considerable saving of crooked timber, as the vertical ribs in this method, having so many points of support from the horizontal timbers, may be formed of a much less size and length, and have large intervals left between them, than could be used in the common method of building, to produce the strength required; and, it is conceived, there may be also a saving in the planking, as in this method, it is imagined no inside planking need be used, but only a boarding nailed on, sufficient to keep the cargo or ballast from resting on the outside planking in the intervals between the ribs, by which it is conceived the farther advantage of facilitating repairs will arise, as by ripping off the said boarding a damaged rib might be removed, and another inserted, without removing the outside plank, or any other part of the frame. Although I have described above those methods which appear to me the best calculated for carrying the principle of my invention into practice, yet minute alterations, arising from the different methods and proficiencies of workmen, will not materially affect the manufacture, if the directions contained in the specification are followed, as they fully disclose the end and principles of the discovery. And, lastly, as much damage happens to vessels from the insufficiency of the present method of closing the seams between the planks, it is proposed, as a farther security to any of the above methods of building, that, if it is thought fit the planks may be grooved at their edges, so as when said planks are put together, the grooves may be opposite each other; and that narrow slips of durable wood be placed in said grooves, so as to lie across the seams the whole length of the planks; the size of the grooves and planks must depend upon the thickness of the planks used, and must be placed so as to leave sufficient space outside them for caulking; and it would be best perhaps to make the slips of less breadth than the grooves, so as to permit their being pressed inward. It is imagined these ships will have the effect of valves to prevent the farther progress of any water that passes the oakum, tending to close the passage more tightly the more they are pressed by the external water. The ends of two planks so grooved, and of the slip between them, are represented in fig. 5."

A ship called the Economy was built according to this patent, and employed in the West India trade some years, having withstood frequent storms and boisterous seas, without the least injury. But the method has not been generally adopted.

Earl Stanhope has also taken out a patent for improvements in ship-building, the specification of which may be seen in the Repertory of Arts, No. 67, New Series; and an account of it, in No. 11 of the Retrospect of Philosophical, &c. Discoveries.

Captain Richard Hall Gower, has proposed to improve the construction of ships, by making them with *four* masts. A vessel called the Transit was built according to this plan in the year 1800, and went some voyages. A full account of the construction, with a history of her voyages, &c. are given by Captain Gower, in the Supplement to his Practical Seamanship.

After all, a complete treatise on ship-building

is still a disideratum: and we most earnestly wish that some gentleman who unites the requisite scientifical and practical attainments would undertake to supply the deficiency.

SHIPPENSBURG, a town of Pennsylvania, in Cumberland county, on a branch of Conedogwinnet creek, which flows into the Susquehanna, 21 miles W.S.W. of Carlisle.

SHI'PMAN. *s.* (*ship* and *man.*) Sailor; seaman (*Shakspeare*).

SHI'PMASTER. *s.* Master of the ship (*Jonas*).

SHI'PPING. *s.* (from *ship.*) 1. Vessels of navigation; fleet (*Raleigh*). 2. Passage in a ship (*John*).

SHIPSTON, a town in a detached part of Worcestershire, surrounded by Warwickshire, with a market on Friday; seated on the Stour, 14 miles W. of Banbury, and 83 N.W. of London.

SHIPWORM, in helminthology. See TEREDO and TEREBELLA.

SHI'PWRECK. *s.* (*ship* and *wreck.*) 1. The destruction of ships by rocks or shelves (*Arbuthnot*). 2. The parts of a shattered ship (*Dryden*). 3. Destruction; miscarriage (1 *Timothy*).

To SHI'PWRECK. *v. a.* (from the noun.) 1. To destroy by dashing on rocks or shallows (*Shakspeare*). 2. To make to suffer the dangers of a wreck (*Prior*). 3. To throw by loss of the vessel (*Shakspeare*).

SHI'PWRIGHT. *s.* (*ship* and *wright.*) A builder of ships (*Shakspeare*).

SHIRAS, or SHIRAUZ, a city of Persia, capital of Farsistan. It is seated at the end of a spacious plain, bounded on all sides by lofty mountains; and is about five miles in circuit, surrounded by a wall, with round towers at the distance of eighty paces. The city is built of brick, and adorned with many fine mosques and noble edifices. Here are many good bazars and caravansaries, also a manufacture of swords. This city was the seat of government under the revered Kerim Khan, who erected many of the fine buildings in and near this place. In its vicinity are numerous summerhouses, with gardens; and the rich wines of Shiras are deemed the best in all Persia. The tomb of the celebrated poet Hafiz is in a large garden on the N.E. side of the city, about two miles from the wall; and at the foot of the mountains, in the same direction, is the tomb of Sadi; also a remarkable channel for water hollowed in a rock. Shiras is 175 miles S. by E. of Ispahan. Lon. 52. 40 E. Lat. 29. 37 N.

SHIRE, is a Saxon word signifying a division; but a county, *comitatus*, of the same import, is plainly derived from *comes*, the count of the Franks; that is, the earl or alderman (as the Saxons called him) of the shire, to whom the government of it was entrusted. This he usually exercised by his deputy, still called in Latin *vice-comes*, and in English the sheriff, shrieve or shire-reve, signifying the officer of the shire; upon whom, in process of time, the civil administration of it totally devolved. In some counties there is an intermediate division between the shire and the hundred; as lathes in Kent and rapes in Sussex, each of them containing about three or four hundreds apiece. These had formerly their lathe-reves and rape-reves, acting in subordination to the shire-reve. Where a county is divided into three of these intermediate jurisdictions, they are called tri-things, which were anciently governed by a trithing-reeve. These trithings still subsist in the large county of York, where, by an easy corruption, they are denominated ridings; the north, the east, and the west riding.

SHIRE-REVE. See SHERIFF.

SHIRT. *s.* (*shiert*, Danish; ſcyꝛc, ſcyꝛꝛc, Saxon.) The under linen garment of a man (*Dryden*).

To SHIRT. *v. a.* (from the noun.) To cover; to clothe as in a shirt (*Dryden*).

SHI'RTLESS. *a.* (from *shirt.*) Wanting a shirt (*Pope*).

SHI'TTAH, SHI'TTIM. *s.* A sort of precious wood, of which Moses made the greatest part of the tables, altars, and planks belonging to the tabernacle. The wood is hard, tough, smooth, without knots, and extremely beautiful. It grows in Arabia (*Calmet*).

SHI'TTLECOCK. *s.* A cork stuck with feathers, and driven by players from one to another with battledoors (*Collier*).

SHIVE. *s.* (*schive*, Dutch.) 1. A slice of bread (*Shakspeare*). 2. A thick splinter, or lamina, cut off from the main substance (*Boyle*).

To SHI'VER. *v. n.* (*schawren*, Germ.) To quake; to tremble; to shudder, as with cold or fear (*Cleaveland*).

To SHI'VER. *v. n.* (from *shive.*) To fall at once into many parts or shives (*Woodward*).

To SHI'VER. *v. a.* To break by one act into many parts; to shatter (*Philips*).

SHI'VER. *s.* (from the verb.) One fragment of many into which any thing is broken (*Shakspeare*).

SHIVER, in mineralogy. See SCHISTUS.

SHIVERS, in the seaman's language, the little rollers or round wheels of pulleys.

SHI'VERY. *a.* (from *shiver.*) Loose of coherence; incompact; easily falling into many fragments (*Woodward*).

SHOAD, among miners, denotes a train of metalline stone, serving to direct them in the discovery of mines.

SHOAD-STONES, a term used by the miners of Cornwall and other parts of this kingdom, to express such loose masses of stone as are usually found about the entrances into mines, sometimes running in a straight course from the load or vein of ore to the surface of the earth. These are stones of the common kinds, appearing to have been pieces broken from the strata or larger masses; but they usually contain mundic, or marcasitic matter, and more or less of the ore to be found in the mine. They appear to have been at some time rolled about in water, their corners being broken off, and their surface smoothed and rounded

The antimony mines in Cornwall are always easily discovered by the shoad-stones, these usually lying up to the surface, or very nearly so; and the matter of the stone being a white spar, or debased crystal, in which the native colour of the ore, which is a shining blueish black, easily discovers itself in streaks and threads.

SHOAL. *s.* (scole, Saxon.) 1. A crowd; a multitude; a throng (*Waller*). 2. A shallow; a sand-bank (*Abbot*).

To SHOAL. *v. n.* (from the noun.) 1. To crowd; to throng (*Chapman*). 2. To be shallow; to grow shallow (*Milton*).

SHOAL. *a.* Shallow; obstructed or incumbered with banks.

SHOALES (Isles of), in N. America, on the coast of New Hampshire. They lie conveniently for the cod-fishery, which was formerly carried on here to great advantage; but the inhabitants are now few and poor.

SHOA'LINESS. *s.* (from *shoaly.*) Shallowness; frequency of shallow places.

SHOA'LY. *a.* (from *shoal.*) Full of shoals; full of shallow places (*Dryden*).

SHOCK. *s.* (*choc*, French; *schocken*, Dut.) 1. Conflict; mutual impression of violence; violent concourse (*Milton*). 2. Concussion; external violence (*Hale*). 3. The conflict of enemies (*Milton*). 4. Offence; impression of disgust (*Young*). 5. (*schocke*, old Dutch.) A pile of sheaves of corn (*Sandys*). 6. (from *shag.*) A rough dog.

SHOCK, in electricity. The effect of the explosion of a charged body, that is, the discharge of its electricity on any other body, is called the electric shock.

To SHOCK. *v. a.* (*schocken*, Dutch.) 1. To shake by violence. 2. To meet force with force; to encounter (*Shakspeare*). 3. To offend; to disgust (*Dryden*).

To SHOCK. *v. n.* 1. To meet with hostile violence (*Pope*). 2. To be offensive (*Addison*).

To SHOCK. *v. n.* (from the noun.) To build up piles of sheaves (*Tusser*).

SHOD, for *shoed*, the preterit and participle passive of *to shoe* (*Tusser*).

SHOE. *s.* plural *shoes*, anciently *shoon.* (sceo, scoe, Saxon; *schoe*, Dutch.) The cover of the foot (*Boyle*).

To SHOE. *v. a.* preterit *I shod*; participle passive *shod.* (from the noun.) 1. To fit the foot with a shoe (*Shakspeare*). 2. To cover at the bottom (*Drayton*).

SHOES, among the Jews, were made of leather, linen, rush, or wood; those of soldiers were sometimes of brass or iron. They were tied with thongs which passed under the soles of the feet. To put off their shoes was an act of veneration; it was also a sign of mourning and humiliation: to bear one's shoes, or to untie the latchets of them, was considered as the meanest service.

Among the Greeks shoes of various kinds were used. Sandals were worn by women of distinction. The Lacedemonians wore red shoes. The Grecian shoes generally reached to the middle of the leg. The Romans us two kinds of shoes; the *calceus*, which covered the whole foot somewhat like our shoes, and was tied above with latchets or strings; and the *solea* or slipper, which covered only the sole of the foot, and was fastened with leathern thongs. The calceus was always worn along with the toga when a person went abroad: slippers were put on during a journey and at feasts, but it was reckoned effeminate to appear in public with them. Black shoes were worn by the citizens of ordinary rank, and white ones by the women. Red shoes were sometimes worn by the ladies, and purple ones by the coxcombs of the other sex. Red shoes were put on by the chief magistrates of Rome on days of ceremony and triumphs. The shoes of senators, patricians, and their children, had a crescent upon them which served for a buckle; these were called *calcei lunati.* Slaves wore no shoes; hence they were called *crctot i* from their dusty feet. Phocion also and Cato Uticensis went without shoes. The toes of the Roman shoes were turned up in the point; hence they were called *calcei, rostrati, repandi,* &c. See CALCEAMENTUM.

In the 9th and 10th centuries the greatest princes of Europe wore wooden shoes, or the upper part of leather and the sole of wood. In the reign of William Rufus, a great beau, Robert, surnamed *the horned,* used shoes with long sharp points, stuffed with tow, and twisted like a ram's horn. It is said the clergy, being highly offended, declaimed against the long-pointed shoes with great vehemence. The points, however, continued to increase till, in the reign of Richard II. they were of so enormous a length that they were tied to the knees with chains sometimes of gold, sometimes of silver. The upper parts of these shoes in Chaucer's time were cut in imitation of a church window. The long-pointed shoes were called *crackowes,* and continued in fashion for three centuries in spite of the bulls of popes, the decrees of councils, and the declamations of the clergy. At length the parliament of England interposed by an act A. D. 1463, prohibiting the use of shoes or boots with pikes exceeding two inches in length, and prohibiting all shoemakers from making shoes or boots with longer pikes under severe penalties. But even this was not sufficient: it was necessary to denounce the dreadful sentence of excommunication against all who wore shoes or boots with points longer than two inches. The present fashion of shoes was introduced in 1633, but the buckle was not used till 1670.

SHOE OF AN ANCHOR, a small block of wood, convex on the back, and having a small hole, sufficient to contain the point of the anchor fluke, on the foreside. It is used to prevent the anchor from tearing or wounding the planks on the ship's bow, when ascending or descending; for which purpose the shoe slides up and down along the bow between the fluke of the anchor and the planks, as being pressed close to the latter by the weight of the former.

To SHOE AN ANCHOR, is to cover the flukes with a broad triangular piece of plank, whose area or superficies is much larger than that of the flukes. It is intended to give the anchor a stronger and surer hold of the bottom in very soft and oozy ground.

SHO'EBOY. *s.* A boy that cleans shoes.

SHOEING, in farriery. Horses, and some other animals destined to labour, are shod with iron, in order to defend and preserve their hoofs. As feet differ, so should shoes accordingly. In a judicious treatise on this subject by Mr. Clark of Edinburgh, the common form of shoes and the method of shoeing are, with great reason, condemned, and a new method recommended, which seems founded on rational principles, and to have been confirmed by experience.

"In preparing the foot for the shoe according to the common method, our author observes, the frog, the sole, and the bars or binders, are pared so much that the blood frequently appears. The common shoe by its form (being thick on the inside of the rim, and thin upon the outside), must of consequence be made concave or hollow on that side which is placed immediately next the foot, in order to prevent its resting upon the sole. The shoes are generally of an immoderate weight and length, and every means is used to prevent the frog from resting upon the ground, by making the shoe heels thick, broad, and strong, or raising cramps or caukers on them.

"From this form of the shoe, and from this method of treating the hoof, the frog is raised to a considerable height above the ground, the heels are deprived of that substance which was provided by nature to keep the crust extended at a proper wideness, and the foot is fixed as it were in a vice.

"By the pressure from the weight of the body, and resistance from the outer edges of the shoe, the heels are forced together, and retain that shape impressed upon them, which it is impossible ever afterwards to remove; hence a contraction of the heels, and of course lameness. But farther—

"The heels being forced together, the crust presses upon the processes of the coffin and extremities of the nut-bone: the frog is confined, and raised so far from the ground, that it cannot have that support upon it which it ought to have: the circulation of the blood is impeded, and a wasting of the frog, and frequently of the whole foot, ensues. Hence proceed all those diseases of the feet known by the names of founder, hoof-bound, narrow-heels, thrushes, corns, high-soles, &c.

"The bad effects of this practice are still more obvious upon the external parts of the hoof. The crust toward the toe, being the only part of the hoof free from compression, enjoys a free circulation of that fluid necessary for its nourishment, and grows broader and longer; from which extraordinary length of toe, the horse stumbles in his going, and cuts his legs. The smaller particles of sand insinuate themselves between the shoe and the heels, which grind them away, and thereby produce lameness. All this is entirely owing to the great spring the heels of the horse must unavoidably have upon the heels of a shoe made in this form.

"This concave shoe in time wears thin at the toe, and, yielding to the pressure made upon it, is forced wider, and of consequence breaks off all that part of the crust on the outside of the nails. Instances of this kind daily occur, insomuch that there hardly remains crust sufficient to fix a shoe upon.

"It is generally thought, that the broader a shoe is, and the more it covers the sole and frog, a horse will travel the better. But, as has been formerly remarked, the broader a shoe is of this form, it must be made the more concave; and, of consequence, the contracting power upon the heels must be the greater. It is likewise to be observed, that, by using strong broad-rimmed concave shoes in the summer-season, when the weather is hot and the roads very dry and hard, if a horse is obliged to go fast, the shoes, by repeated strokes (or friction) against the ground, acquire a great degree of heat, which is communicated to the internal parts of the foot; and, together with the contraction upon the heels occasioned by the form of the shoe, must certainly cause exquisite pain. This is frequently succeeded by a violent inflammation in the internal parts of the hoof, and is the cause of that disease in the feet so fatal to the very best of our horses, commonly termed a founder. This is also the reason why horses, after a journey or a hard ride, are observed to shift their feet so frequently, and to lie down much.

"If we attend further to the convex surface of this shoe, and the convexity of the pavement upon which horses walk, it will then be evident that it is impossible for them to keep their feet from slipping in this form of shoe, especially upon declivities of the streets.

"It is also a common practice to turn up the heels of the shoes into what are called cramps or caukers, by which means the weight of the horse is confined to a very narrow surface, viz. the inner round edge of the shoe-rim and the points or caukers of each heel, which soon wear round and blunt; besides, they for the most part are made by far too thick and long. The consequence is, that it throws the horse forward upon the toes, and is apt to make him slip and stumble. To this cause we must likewise ascribe the frequent and sudden lameness horses are subject to in the legs, by twisting the ligaments of the joints, tendons, &c.

"I do not affirm that caukers are always hurtful, and ought to be laid aside: on the contrary, I grant, that they, or some such-like contrivance, are extremely necessary, and may be used with advantage upon flat shoes where the ground is slippery; but they should be made thinner and sharper than those commonly used, so as to sink into the ground, otherwise they will rather be hurtful than of any advantage.

"In shoeing a horse, we should in this, as in every other case, study to follow nature: and certainly that shoe which is made of such a form as to resemble, as near as possible, the natural tread and shape of the foot, must be preferable to any other.

"But it is extremely difficult to lay down fixed rules with respect to the proper method to be observed in treating the hoofs of different horses: it is equally difficult to lay down any certain rule for determining the precise form to be given their shoes. This will be obvious to every judicious practitioner, from the various constructions of their feet, from disease, and from other causes that may occur; so that a great deal must depend upon the discretion and judgment of the operator, in proportioning the shoe to the foot, by imitating the natural tread, to prevent the hoof from contracting a bad shape.

"It is to be remembered, that a horse's shoe ought by no means to rest upon the sole, otherwise it will occasion lameness; therefore it must rest entirely on the crust: and, in order that we may imitate the natural tread of the foot, the shoe must be made flat (if the height of the sole do not forbid it); it must be of an equal thickness all around the outside of the rim; and on that part of it which is to be placed immediately next the foot, a narrow rim or margin is to be formed, not exceeding the breadth of the crust upon which it is to rest, with the nail-holes placed exactly in the middle; and from this narrow rim the shoe is to be made gradually thinner towards its inner edge.

"The breadth of the shoe is to be regulated by the size of the foot, and the work to which the horse is accustomed: but, in general, it should be made rather broad at the toe, and narrow towards the extremity of each heel, in order to let the frog rest with freedom upon the ground. The necessity of this has been already shewn.

"The shoe being thus formed and shaped like the foot, the surface of the crust is to be made smooth, and the shoe fixed on with eight or at most ten nails, the heads of which should be sunk into the holes, so as to be equal with the surface of the shoe. The sole, frog, and bars, as I have already observed, should never be pared, farther than taking off what is ragged from the frog, and any excrescences or inequalities from the sole. And it is very properly remarked by Mr. Osmer, 'That the shoe should be made so as to stand a little wider at the extremity of each heel than the foot itself: otherwise, as the foot grows in length, the heel of the shoe in a short time gets within the heel of the horse; which pressure often breaks the crust, and produces a temporary lameness, perhaps a corn.'

"But so much are farriers, grooms, &c. prejudiced in favour of the common method of shoeing and paring out the feet, that it is with difficulty they can even be prevailed upon to make a proper trial of it. They cannot be satisfied unless the frog be finely shaped, the sole pared, and the bars cut out, in order to make the heels appear wide. This practice gives them a show of wideness for the time; yet that, together with the concave form of the shoe, forwards the contraction of the heels, which, when confirmed, renders the animal lame for life.

"In the flat form of shoe, its thickest part is upon the outside of the rim, where it is most exposed to be worn; and being made gradually thinner towards its inner edge, it is therefore much lighter than the common concave shoe: yet it will last equally as long, and with more advantage to the hoof; and as the frog or heel is allowed to rest upon the ground, the foot enjoys the same points of support as in its natural state. It must therefore be much easier for the horse in his way of going, and be a means of making him surer-footed. It is likewise evident, that, from this shoe, the hoof cannot acquire any bad form; when, at the same time, it receives every advantage that possibly could be expected from shoeing. In this respect it may very properly be said, that we make the shoe to the foot, and not the foot to the shoe; as is but too much the case in the concave shoes, where the foot very much resembles that of a cat's fixed into a walnut-shell.

"It is to be observed, that the hoofs of young horses, before they are shod, for the most part are wide and open at the heels, and that the crust is sufficiently thick and strong to admit of the nails being fixed very near the extremities of each. But, as I have formerly remarked, from the constant use of concave shoes, the crust of this part of the foot grows thinner and weaker; and when the nails are fixed too far back, especially upon the inside, the horse becomes lame: to avoid this, they are placed more towards the fore-part of the hoof. This causes the heels of the horse to have the greater spring upon the heels of the shoe, which is so very detrimental as to occasion lameness; whereas, by using this flat form of shoe, all these inconveniences are avoided; and if the hoofs of young horses, from the first time that they were shod, were continued to be constantly treated according to the method here recommended, the heels would always retain their natural strength and shape.

"It has been alleged, that in this form of shoe horses do not go so well as in that commonly used. This objection will easily be set aside, by attending to the following particulars. There are but few farriers that can or will endeavour to make this sort of shoe as it ought to be. The iron, in forming it, does not so easily turn into the circular shape necessary as in the common shoe; and perhaps this is the principal reason why they object to it, especially where they work much by the piece. And as many horses that are commonly shod with concave shoes have their soles considerably higher than the crust, if the shoe is not properly formed, or if it is made too flat, it must unavoidably rest upon the sole, and occasion lameness.

"The practice of paring the sole and frog is also so prevalent, and thought so absolutely necessary, that it is indiscriminately practised, even to excess, on all kinds of feet: and while this method continues to be followed, it cannot be expected that horses can go upon hard ground (on this open shoe) with that freedom they would do if their soles and frogs were allowed to remain in their full natural strength.

"There is one observation I would farther make; which is, that the shoe should be made of good iron, well worked, or what smiths call hammer-hardened, that is, beaten all over lightly with a hammer when almost cold. The Spanish and Portuguese farriers use this practice greatly, insomuch that many people, who have seen them at work, have reported that they form their horses' shoes without heating them in the fire as we do. It is well known, that heating of iron till it is red softens it greatly; and when shoes thus softened are put upon horses' feet, they wear away like lead. But when the shoes are well hammered, the iron becomes more compact, firm, and hard; so that a well-hammered shoe, though made considerably lighter, yet will last as long as one that is made heavier; the advantage of which is obvious, as the horse will move his feet with more activity, and be in less danger of cutting his legs.

"The common concave shoes are very faulty in this respect: for, in fitting or shaping them to the foot, they require to be frequently heated, in order to make them bend to the unequal surface which the hoof acquires from the constant use of these shoes: they thereby become soft; and to attempt to harden them by beating or hammering when they are shaped to the foot would undo the whole. But flat shoes, by making them, when heated, a little narrower than the foot, will, by means of hammering, become wider, and acquire a degree of elasticity and firmness which it is necessary they should have, but impossible to be given

them by any other means whatever; so that any farrier, from practice, will soon be able to judge, from the quality of the iron, how much a shoe, in fitting it to the circumference of the hoof, will stretch by hammering when it is almost cold: this operation, in fitting flat shoes, will be the less difficult, especially when it is considered, that as there are no inequalities on the surface of the hoof (or at least ought not to be) which require to be bended thereto, shoes of this kind only require to be made smooth and flat; hence they will press equally upon the circumference or crust of the hoof, which is the natural tread of a horse."

Mr. Moorcroft, a late ingenious veterinary practitioner in London, avowed a preference to this kind of shoe, which he calls the "seated shoe," and which he formed in a die, in the same manner that money is struck in coining. His figure of the shoe is given in the plate, and his account of it is as follows:

"The shoe best calculated to answer the purpose," says he, "is that so strongly recommended by Mr. Osmer and Mr. Clark. The upper surface of this shoe consists of two parts: an outer part, which is a perfect plane near the rim, corresponding with the breadth of the crust, and called the seat; and an inner part, sloping from the seat, and distinguished by the name of the bevel.

"The seat is obviously intended to support the crust in its whole extent, the bevel to lie off the sole; and this part being more or less broad, according to the kind of work proposed to be done, will give the requisite strength to the shoe

"As the whole of the crust bears on the seat, it is less liable to be broken than when only a small part of it rests on the shoe. In consequence, likewise, of the crust resting on the flat seat, the weight of the body has a tendency to spread the foot wider in every direction, rather than to contract it, as has been observed to happen with the common shoe: and it has in fact been found, in various instances, that a foot contracted by the common shoe, and afterwards shod with the seated one, has become wider without the horse having been taken from his usual work; and again, that a foot being of a full size and proper form when first shod with the seated shoe, has retained the same size and form without the slightest alteration, as long as the seated shoe was used.

"By the slope or bevel in the shoe, a cavity is formed between it and the sole, sufficient to admit a picker, and to prevent pressure on this part, without the sole itself being hollowed, and consequently weakened.

"For if it be one of the functions of the horny sole to defend the sensible sole, of which, from its situation and nature, no one can doubt, it must be evident, that the more perfect it is left, the stronger it must necessarily be, and of course the more competent to perform its office."

Mr. Coleman, however, states as objections, that the sole may be pressed by this form of the shoe, and that the flat part of the shoe is made of the same breadth at the quarters, as at the toe. These objections, however, bear rather on an imperfect practice, than an erroneous principle, in Osmer's mode of shoeing, as may be seen above, where direction is given to slope, or bevil the shoe, that a cavity may be formed between it and the sole. But the grand objection of the smiths, probably, to Osmer's shoe, subsists in its being somewhat more difficult to forge than the common one, to which they have been accustomed.

Professor St. Bel, who has not on all points reasoned so correctly, observes, "that the feet of horses at their inferior surface are naturally concave, flat, or convex. Suppose, for instance, a foot well formed and properly concave; a second, flat; and a third, convex. The inconveniencies attending the convex and flat foot will be considerably increased by shoes with a similar surface, because the iron of the shoe being harder than the horn of the hoof presents a smoother and more polished surface, and, consequently, more liable to slip. On this account therefore it is, that I have proposed the concave shoe, that is to say, concave in its lower surface, because it represents the natural shape of the foot, and because it fulfils, in every respect, the views and intentions of nature; and I am therefore convinced that it ought to be applied to all good feet.

"As some cases are to be excepted from every general rule, so here the use of the concave shoe is to be excepted from the case of a flat foot, and especially of a convex one: but it does not follow from this exception, that the use of this shoe may not become general in time; because it must be remembered, that feet only become flat and convex through bad shoeing, or by some accident, as when a horse is foundered; and that no horses, not even those bred in marshy and low lands, are foaled with this imperfection. Nor can we be justified in accusing nature with having neglected to provide sufficiently for the foundations of this admirable machine, when at the same time the same machine affords us so many convincing proofs both of her wisdom and her providence.

"It is also of principal importance to determine the weight of the shoe; for it is matter of astonishment to see some horses with shoes weighing each five pounds, making together a burthen of twenty pounds of iron attached to their four feet. It is obvious to common sense, that such an additional weight fixed to the extremity of the leg must be productive of some inconvenience or other; and in fact the muscles are thereby compelled to greater exertion, the ligaments are stretched, and the articulations continually fatigued: and besides all these evil consequences, the shoe by its weight forces out the nails, and so entirely spoils the texture of the wall, or crust, that it becomes often extremely difficult to fix the shoe to the hoof.

"The weight which we propose for shoes of different kinds is nearly as follows:

	lb.	oz.
1. For the strongest sort of cart horses,	2	12
2. For the smaller horses of this kind,	1	12
3. For the largest coach horses,	1	12
4. For the smaller ditto,	1	4
5. For saddle horses of any height,	1 lb. 2 oz. to 10	
6. For race horses,	5 oz. to 4	

By reducing the superfluous breadth of these shoes, their thickness may be increased without making any addition to their weight."

Mr. Coleman expresses his sentiments of the shoe proposed by Mr. St. Bel, in the following words: "Mr. St. Bel employed a shoe with a flat upper surface; but, from not attending to the very important operation of removing the sole under the heels of the shoe, to every kind of hoof, it frequently failed of success.

"The best form for the external surface of the shoe is a regular concavity; that is, the common shoe reversed. This shoe leaves the hoof of the same figure when shod, as before its application. And it is evident, that a concavity has more points of contact with pavement and other convex bodies than a flat or convex surface, and that the horse is consequently more secure on his legs. A shoe that is flat externally may preserve the hoof equally well in health; but this form is not so well calculated to prevent the horse from slipping as a concavity.

"There are two circumstances necessary to be attended to in shoeing, viz. to cut the hoof and apply the shoe. Before the hoof is protected by iron, some parts require to be removed, and others preserved. This is even of more importance than the form of the shoe. But many have attended chiefly to the shoe, and not to its application, or to the hoof; and this error has produced more mischief, and more enemies to the Veterinary College, than all the prejudices and calumnies of grooms and farriers.

"The first thing to be attended to is to take away a portion of the sole between the whole length of the bars and crust, with a drawing-knife; for the heels of the sole cannot receive pressure without corns. To avoid this, the sole should be made concave, so as not to be in contact with the shoe. If there be any one part of the practice of shoeing more important than the rest, it is this removal of the sole, between the bars and crust. When this is done, the horse will always be free from corns, whatever may be the form of the shoe.

"Besides this, the heels of the shoe should be made to rest on the junction of the bars with the crust: whereas, if the bars are removed, the shoe is supported by the crust only, and not by the solid broad basis of crust and bars united.

"It is necessary that the sole should be cut before any other part of the hoof be removed. If the heels have been first lowered by the butteris, then possibly there may not be sufficient sole left to enable a drawing-knife to be applied, without reaching the sensible sole; whereas, by cutting the sole in the first instance, we can determine on the propriety of lowering the heels and shortening the toe. The sole can then descend, without the motion being obstructed by the shoe; and any foreign bodies that may have got into this cavity are always forced out when the sole descends, without producing any mischief.

"When the shoe is applied, the cavity between the sole and shoe should be sufficiently large, at every part, to admit a large horse picker, and particularly between the bars and crust. If the sole is naturally concave, a shoe with a flat surface applied to the crust will not touch any part of the sole; and if the sole be flat, or even convex in the middle, or towards the toe, the quarters and heels of the sole will generally admit of being made concave with a drawing knife, so as not to receive any pressure from a flat shoe.

"If a shoe with a flat upper surface does not leave ample space for a picker, between the sole and shoe, then it is requisite to make either the sole or the shoe concave. When the sole appears in flakes, and thick in substance, it will be better to make the whole of the sole concave by a drawing knife; and this operation should always be performed before the toe is shortened or the heels lowered. When we have made the sole hollow, then a shoe with a flat surface will rest only on the crust: but if the sole be flat, or convex, and thin towards the toe and middle of the hoof, so as to prevent the possibility of removing the sole at these parts to form a concavity, then it is necessary to employ a shoe sufficiently concave to avoid pressure, and to admit a picker. In this case, however, the sole at the heels and quarters, even in convex feet, will generally allow of removal with a drawing knife, and then the quarters and heels of the shoe may be flat. It therefore follows, that, where the sole can be made concave, a shoe with a flat surface may with safety be applied; but where parts of the sole, from disease or bad shoeing, become flat, a shoe with a concave surface is required. As the hoof is always growing, and as the shoe preserves it from friction, the toe of the crust requires to be cut once in about twenty-eight days. The more horn we can remove from this part, the sooner it will be proper to apply a shoe thin at the heels, without mischief to the muscles and tendons, and the horse will be less liable to trip.

"The bars and frog should never be removed. What is ragged and detached had better be cut off with a knife by the groom than left to the farrier, who will perhaps remove some of the sound parts. Where the frog is not large and projecting, the heels may be lowered by a rasp or the butteris, for in every case we are to endeavour to bring the frog in contact with the ground. The frog must have pressure or be diseased (see FROG). Nevertheless, when the frog has been disused for a considerable period, and become soft, it must be accustomed to pressure by degrees. If the quarters are high, and much exceed the convexity of the frog, we should gradually lower the heels, and endeavour to bring the frog and heels of the shoe on the same parallel line. Where work is required of the horse, while the frog is soft and diseased, it may be gradually used to pressure, by lowering the hoof about the tenth of an inch, every time of shoeing, until the frog be hard, and equally prominent with the heels; or if the horse is not wanted, great advantage would be derived from his standing without shoes on a hard pavement.

"After the hoof has been properly prepared, then it is requisite to apply a shoe, and to vary its length, breadth, and thickness at the heel, surfaces, &c. according to the hoof. If the heels of the fore feet are two inches and a half or more in depth, the frog sound and prominent, and the ground dry, then only the toe of the hoof requires to be shortened, and afterwards protected by a short shoe made of the usual thickness at the toe, but gradually thinner towards the heel. For a common sized saddle-horse, it may be about three-eighths of an inch thick at the toe, and one-eighth at the heel. The intention is, to bring the frog completely into contact with the ground, to expand the heels, prevent corns, thrushes, and canker. If applied in May or June when the ground is dry, it may be continued all the summer; and in warm climates, where this is the case, no other protection for the hoof is requisite."

The professor here observes, that so long as the wear of the hoof is not greater than the supply afforded by nature from the coronet, so long may the short shoes be worn; but in wet weather this is not the case: "I have known," says he, "some light horses to wear them the whole

year; but such instances are not common. Nevertheless, the short shoe can be employed on most horses with advantage in summer, when the heels are from two and a half to three inches in depth, and the frog equally prominent: but, unless the hoof has been properly preserved, the heels and frog are generally too low for the short shoe. The toe of the horse requires to be shortened as much as possible; but if the frog touches the ground, no part of the heels should be cut; and, by pursuing this practice, the heels will frequently grow sufficiently high to receive the short shoe."

Mr. Lawrence, on the other hand, in his Philosophical and Practical Treatise on Horses, questions, on various grounds, the correctness of the term pressure, as of late years applied to the frog of the horse's foot; asserting that, in great numbers of feet, in their natural and healthy state, the frog is not of sufficient growth or bulk for such purpose; and, that the frogs of most horses, even amply furnished by nature with that part, are too sensible and tender to admit of being exposed to constant contact with the hard roads, for which, however, he is a strenuous advocate whenever practicable, as he is for the concavity of the external surface of the shoe, the discovery of which he attributes not to St. Bel, but to Cæsar Fiaschi, who lived many centuries past. Mr. Lawrence observes—"By the experiment of weakening or lowering the shoe heels, in order to bring a deficient frog into contact with the ground, however gradually I proceeded, I have lamed several horses. St. Bel also did the same, on the first establishment of the Veterinary College.

"It is sufficiently obvious, that, by such means, the back sinews, as they are commonly styled, must be exposed to unusual extension. Such a plan is perhaps scarcely ever eligible, excepting indeed when necessary to reduce the feet to their proper level, in the fortunate case of a natural luxuriance of growth in the frog, which it is the epidemic madness of farriers and smiths to cut away, in order to the miserable and useless substitute of a thick-heeled shoe. The friction of our hard roads, indeed of any roads, will always keep within bounds the most luxuriant frogs. In the first shoeing a colt, it is of the utmost importance that his frogs, if he have a sufficient growth of them, which is not always the case, be brought to touch the earth, not, however, by the use of any measures of force, or of setting the foot in an unnatural or an uneven position: the paring around, or moderately lowering the crust of the foot, when so deep as to compress and injure the growth of the frog, is yet not only perfectly safe, but highly necessary. It will soon appear whether the horse's frogs and heels be of that nature to endure the concussion of the hard roads, which most assuredly, notwithstanding much confident assertion, too many never can endure; and if a bruised frog be not very common, all practical horsemen are enough convinced how extremely liable the heels of horses are to contusion and inflammation. In bad cases of this kind, the only, and too much neglected, remedy of the bar-shoe has been already appreciated: in general, to set such feet upon their natural level, all which ought to be attempted, will require shoe-heels of considerable strength."

This author professes to be unaware of any essential improvement of the shoe of Osmer, with the exception of the revival by St. Bel of the concave external surface, notwithstanding the numerous variations which have been attempted; and represents the shoes of Osmer and Clark, already described, as still of the highest repute; those of the superior kind of farriers being imitations of the former in certain degrees; whilst those of the lower smiths, especially of the country, resemble yet too much the convex surface, internal concavity, inordinate length and weight of former days.

Mr. Moorcroft formerly published a pamphlet, consisting chiefly of the directions of the French Veterinary School, for preventing a horse from "striking the foot or shoe against the opposite leg." This accident happens to the horse in two modes, by which he either strikes the pastern joint, or the shank above, near the inside of the knee: the old English stable terms in this case were *knocking*, applied to the pastern, and the *speedy cut* to the shank above. These revived directions produced no more success, nor so much attention, as they originally experienced, and for the following reasons, assigned by Mr. John Lawrence, just quoted, a writer, allowed, on all hands, to be practical. The general cause of knocking and cutting in the horse, is mal-conformation, crookedness of the pastern joints, and the toe pointing inward or outward, whence he will strike the opposite leg with either the toe or heel, even if ridden without shoes. Width of chest is no kind of security against this defect: and if any preventive measures by shoeing, recommended by Moorcroft and others, which, beside, have the disadvantage of placing the horse in an unnatural and dangerous position, may have a temporary good effect, it ceases the instant the horse becomes, in the smallest degree, fatigued and legweary, and even, perhaps, after a few miles travel. On this account, the possessors of horses which wound their legs in action have generally, in former days, and at present, been under the necessity of adopting the leathern guard as their only resource.

The same author disputes, on his own experience, the idea promulgated of late, that the running thrush on the horse's foot is invariably caused by bad shoeing, averring that it is often a constitutional defect in the horse; questions the utility of the ancient practice lately revived, of exposing the naked feet of horses to stone pavement, with the view of hardening them; and strongly reprobates another revival of the practice of unenlightened times, on the obvious principles of quackery, namely, the barbarous and useless mechanical extension of naturally narrow heels.

Mr. Bracy Clark, a respectable veterinary surgeon, has published certain experiments on the foot of the living horse. His object appears to be the partial or total abolition of the use of the iron shoe.

Whenever the roads are covered with ice, it becomes necessary to have the heels of a horse's shoes turned up, and frequently sharpened, in order to prevent him from slipping and falling; but this cannot be done without the frequent moving of the shoes, which breaks and destroys the crust of the hoof where the nails enter. To prevent this, it is recommended to those who are willing to be at the expence to have steel points screwed into the heels or quarters of each shoe, which might be taken out and put in occasionally.

The method of doing this properly, as directed by Mr. Clark, is first to have the shoes fitted to the shape of the hoof, then to make a small

round hole in the extremity of each heel, or in the quarters, about three-eighths of an inch in diameter, or more, in proportion to the breadth and size of the shoe; in each of these holes a screw is to be made: the steel points are likewise to have a screw on them, exactly fitted to that in the shoes. Care must be taken that the screw on the points is no longer, when they are screwed into the shoe, than the thickness of the latter. The steel points are to be made sharp; they may either be made square, triangular, or chissel pointed, as may be most agreeable; the height of the point above the shoe should not exceed a quarter of an inch for a saddle horse; they may be made higher for a draught horse. The key or handle that is necessary to screw them in and out occasionally is made in the shape of the capital letter T, and of a sufficient size and strength. At the bottom of the handle, a socket or cavity must be made, properly adapted to the shape of the steel point, and so deep as to receive the whole head of the point that is above the shoe. In order to prevent the screw from breaking at the neck, it will be necessary to make it of a gradual taper; the same is likewise to be observed of the female screw that receives it, that is, the hole must be wider on the upper part of the shoe than the under part: the sharp points may be tempered or hardened, in order to prevent them from growing too soon blunt; but when they become blunt, they may be sharpened as at first. These points should be unscrewed when the horse is put into the stable, as the stones will do them more injury in a few minutes than a day's riding on ice. A draught horse should have one on the point of each shoe, as that gives him a firmer footing in drawing on ice; but for a saddle horse, when points are put there, they are apt to make him trip and stumble.

When the shoes are provided with these points, a horse will travel on ice with the greatest security and steadiness, much more so than on causeway or turnpike roads, as the weight of the horse presses them into the ice at every step he takes.

Besides the common shoe for horses that have sound feet, there are also others of various shapes, determined by the necessity of the case, that is to say, by the different derangements and diseases to which the horse's foot is liable. Such, for instance, are, what farriers call the covered, flat, or convex shoe; the patten-shoe; the shoe for all feet, simple, double, and hinged; the shoe without nails, the half-moon shoe, the Turkish shoe, and the slipper shoe. Eight nails for each shoe are enough for saddle and light draught horses; but for such as are employed in heavy draught, ten are required. A smaller number, it is found, do not hold the shoe sufficiently fast; and a greater number, by acting like so many wedges, weaken the hoof, and rather dispose the crust to break off, than give additional security.

The manner of disposing the nails has differed considerably at different times. Some writers have directed four to be placed on each side of the foot, and the hindmost near the heel; leaving between the two rows of nails a considerable space of the fore part of the foot without any.

The nails thus placed certainly confined the foot at the sides and heels, left the toe at liberty, and assisted materially the effect of the sloping surface of the common shoe, in altering the form of the foot from nearly a round to a lengthened figure.

Latterly, it has been strongly recommended to place the nails principally at the fore part of the foot, in order to prevent the heels from being confined. And certainly this is a wiser practice than the former; but as the foot should rest on the shoe in the whole extent of the crust, it may be thought, that the best way of connecting them in every part alike would be that of placing the nails at equal distances from each other, in the whole round of the shoe.

However, the objection to this is, that when the foot strikes the ground with considerable force, the back part of it becomes a little broader than when it is in the air, or when the foot is at rest. This spreading is not considerable, nor does it extend far along the sides of the foot, but it is sufficient to act upon the hindmost nails, when near the heels; hence arises the necessity for there being a greater distance between the last nail and the heel of the shoe, than between any two nails. Accordingly it may be laid down as a general rule, that the last nail should not be nearer the heel than from two inches to an inch and a half.

Such a distance has been found sufficient to prevent the heels being confined; and not sufficiently great to allow the shoe to spring, and loosen the last nails, as frequently happens when they are farther distant from the heel.

All the nails should be at equal distances from each other, except the two in front, which should be a little wider apart than the rest: this, however, is not a matter of essential consequence; but it is of importance that there should not be any nail in the middle of the toe. For, generally, the action of the foot on the ground has a direct tendency to push the shoe, as it were, backwards along the foot; and it sometimes happens that the shoe is actually thus displaced; in which case, it necessarily follows, that the nail in the middle of the toe must be driven immediately against the sensible parts behind it; whilst the rest of the nails, in great measure, follow the line of the crust, and so avoid doing mischief to the parts within.

The nail-holes on the upper surface of the shoe should come through the seat, close to the edge of the bevel, that the nails may have a proper and equal hold on every part of the crust, which will be shown by the clenched ends being each equally distant from the shoe.

As the nail-hole is always made with a taper and square pointed punch, a nail with a head of the same form will fit it better than one of any other shape.

To prevent the necessity of frequent removes, several expedients have been put in practice. Sometimes a few nails, of a larger size than the rest, have been so put in, that the heads stood considerably beyond the level of the shoe; but when these did not break off, as was often the case, they soon wore down.

At other times, nails with large heads, tapering to a point, were screwed into the web of the shoe. Of these, one was usually placed at the toe, and one at each heel. And by this contrivance of the screw, it was imagined that the nails might be easily replaced when worn out. They are apt, however, to break off at the neck, and are too expensive for common use.

There is, notwithstanding, another plan, which, as far as it has been tried, justifies the author in recommending it.

This consists in having nails with a lozenge head, or what may be called a double countersink, terminating in an edge, instead of coming to a point. This greater breadth of surface prevents

its being rubbed away as fast as a point; the thickness in the middle gives it strength; and the regular taper to the shank causes it to apply exactly to the sides of the hole in the shoe, by which it is equally supported, and prevented from bending or breaking. There should be four nails to every shoe; that is to say, two in the forepart, and one at each heel.

The heads of these nails must be struck in tools, or dies; the four holes in the shoe must be made to correspond with the neck of the nail; and when the nail is driven, the workman must cover the head with a tool, which will receive its upper part, and prevent its being injured by the hammer.

These nails are, in effect, so many caulkings, with the advantages of allowing a more level tread; of being easily replaced, by putting new nails in the old holes; and by being at a distance from the heel of the shoe, they are not so likely to hurt the opposite leg.

The nails and nail-holes, however, employed at the Veterinary College, are very different from those in common use. The latter are stamped with a punch of a particular form; and the heads being of a conical shape, are received into the nail-holes, so as to preserve their hold as long as the shoe exists. Mr. Spencer is the inventor of these nails, which, though made of a more durable metal, are little more in price than the common sort.

"The head of the common nail," says Mr. Coleman, "is not conical, but nearly square (as at *c*,) and no part is received into the nail-hole. When the nail is driven into the shoe up to the head, the farrier generally continues to hammer with great violence; and, as the nail-hole cannot admit the head, the texture of the nail contiguous to the head is shivered, and, in a few days, is broken:—whereas the head of Mr. Spencer's nail operates as a wedge; the more it is hammered, the more closely it is connected with the nail-hole, so as to become part of the shoe. Moreover, the head of the common nail, when not injured by the farrier, projects beyond the shoe; and, when worn out, the shoe is liable to come off. This accident will more frequently happen if the nails are placed in the old nail-holes of the crust: before the nail-holes of the shoe are punched, the farrier should examine the situation of the former nails; and by having new crust for the nails, the shoe will be more firmly connected with the hoof."

It now only remains for us to conclude the present article with some few remarks on the shoeing of other animals employed in the service of man, and especially the mule, the ox, and the ass.

The shoe for the fore feet of the mule is, in general, very similar to that which the farriers call the bar shoe. It is very wide and large, especially at the toe, where it sometimes projects four inches and upwards beyond the hoof. This excess is given it with a view to enlarge the basis of the foot, which is in general exceedingly narrow in this animal. The shoe for the hind feet is open at the heels, like the horse's shoe; but it is lengthened at the toe, like the preceding one. The former is called in French *planche*, and the latter *florentine*.

The foot of the ass having the same shape as that of the mule, requires the same kind of shoe, with this only difference, that the shoe for the fore foot is not closed at the heels, and that its edges do not project so much beyond the hoof. The same form of shoe is used for the hind feet of this animal.

The ox's shoe consists of a flat plate of iron, with five or six stamp-holes on the outward edge to receive the nails; at the toe is a projection of four or five inches, which, passing in the cleft of the foot, is bent over the hoof, so as to keep the shoe in its proper place. In many parts of France, where the ox is used for draft, it is sometimes necessary to employ eight shoes, one under each nail; or four, one under each external nail; and sometimes only two, one under the external nail of each fore foot.

In the description here given of the mule's and ass's shoe, we cannot avoid condemning the cruel and ignorant practice of extending the toe of the shoe so far beyond the toe of the hoof. See Veterinary Science, Plate LXXIX.

SHOEING-HORN. *s.* (*shoe* and *horn*.) 1. A horn used to facilitate the admission of the foot into a narrow shoe. 2. Any thing by which a transaction is facilitated: in contempt (*Spectator*).

SHO'EMAKER. *s.* (*shoe* and *maker*.) One whose trade is to make shoes (*Watts*).

SHO'ETYE. *s.* (*shoe* and *tye*.) The ribband with which women tye shoes (*Hudib.*).

SHOG. *s.* (from *shock*.) Violent concussion (*Bentley*).

To SHOG. *v. a.* To shake; to agitate by sudden interrupted impulses (*Carew*).

SHONE. The preterit of *shine*.

SHOOK. The preterit, and in poetry participle passive, of *shake*.

SHOOMSKA, one of the Kurile islands, three leagues S. of Cape Lopatka, in Kamtschatka. Its inhabitants consist of a mixture of natives and Kamtschadales. See KURILES.

To SHOOT. *v. a.* preterit *I shot*; participle *shot* or *shotten*. (rceotan, Saxon.) 1. To discharge any thing so as to make it fly with speed or violence (*Milton*). 2. To discharge as from a bow or gun (*Shakspeare*). 3. To let off (*Abbot*). 4. To strike with any thing shot (*Exodus*). 5. To emit new parts, as a vegetable (*Mark*). 6. To emit; to dart or thrust forth (*Addison*). 7. To push suddenly (*Dryden*). 8. To push forward (*Psalms*). 9. To fit to each other by planing: a workman's term (*Moxon*). 10. To pass through with swiftness (*Dryden*).

To SHOOT. *v. n.* 1. To perform the act of shooting, or emitting a missile weapon (*Tem.*). 2. To germinate; to increase in vegetable growth (*Cleaveland*). 3. To form itself into any shape, by emissions from a radical particle (*Burnet*). 4. To be emitted (*Watts*). 5. To protuberate; to jet out (*Abbot*). 6. To pass an arrow (*Addison*). 7. To become any thing suddenly (*Dryden*). 8. To move swiftly along (*Dryden*). 9. To feel a quick glancing pain.

SHOOT. *s.* (from the verb.) 1. The act or impression of any thing emitted from a distance (*Bacon*). 2. The act of striking, or endeavouring to strike, with a missive weapon discharged by any instrument (*Shakspeare*). 3. (*scheuten*, Dutch.) Branches issuing from the main stock (*Evelyn*).

SHOO'TER. *s.* (from *shoot*.) One that shoots; an archer; a gunner (*Herbert*).

SHOOTER'S HILL, a village in Kent,

situate on a hill so called, eight miles E.S.E. of London. The hill affords a very extensive prospect, and the Thames makes a magnificent appearance from it. On the W. part of this hill is a lofty tower, erected by lady James, to commemorate the reduction, in 1756, of Severndroog, a strong fort in the East Indies, by her husband, commodore James. It is called Severndroog Castle, is of a triangular form, and contains some of the arms, ornaments, &c. taken from the enemy. The lower part of this tower is "embowered thick in tufted trees;" while from the upper rooms and the battlements the eye may enjoy one of the finest panoramic views in England.

SHOOTING, in sportsmanship, the killing of game by the gun, with or without the help of dogs. It is now generally confined to flying or running, especially the first; which, by experience, is found to be the best and most diverting way of shooting; indeed there is scarcely any other than these two in use now among gentlemen, for few will watch by a river side to shoot wild fowl; although about a century ago, to shoot flying was looked on as a rare accomplishment in a sportsman. It is necessary for any person who sports much to have two guns; the barrel of one about two feet nine inches, which will serve very well for the beginning of the season, and for wood-shooting; the other about three feet three inches, for open-shooting after Michaelmas; the birds by that time are grown so shy, that your shoots must be at longer distance. But if you intend one gun to serve for all purposes, a three-feet barrel, or thereabouts, is most proper.

You should always have it cocked in readiness, holding your thumb over the cock, lest it go off when you would not have it.

It is generally accounted the best way to aim at the head, if the game fly over your head; but to aim as it were under the belly, if it fly from you; and it will be best to let the game fly a little past you before you fire, for so doing the shot will the better enter the body. Shot delivered from a gun in general lose or decrease half the quantity every ten yards, or thereabouts; so that at forty yards there will not be thrown in above a fourth of what would be into the same space at twenty yards. From which it appears, that if you take aim a foot before a cross shoot at forty yards, you will be the most likely to meet the bird with the centre shot; and which is looked upon to fly the strongest, and to be the more efficacious at long distances, than the diverging shot; for whatever be the cause of their diverging, it must in some degree retard their motion. But if there be a brisk wind, it will certainly bend the course of the shot; you must therefore consider, whether the wind blow with the bird, or against it; if it blow with it, you need little more than to observe the general rule; because the wind helps the bird forward nearly as much as it diverts the shot: but if it fly against the wind, the shot declines more than the bird is retarded, and therefore you ought to take aim at a greater distance before the bird.

One good pointer in the field at a time, if you have patience to attend him, will be sufficient for two men to shoot with; but if you have an old spring spaniel, that is so well under command that you can always keep him near you, such a dog may be used with your pointer with great advantage: as he will better find birds that are wounded, and also spring such as are near you, which you otherwise might pass. But if you should be fond of hunting many pointers together in a field, as is frequently done, you should not have more than one amongst them, who has been taught to fetch his game; lest by endeavouring to get it from each other, they should tear it.

Two persons in the field with guns are better than more at partridge shooting; who should with patience pay a due attention to each other. When your dog points, walk up without any hurry, separating a few yards, one to the right, the other to the left of your dog: if a covey spring, never shoot into the midst of them, but let him on the left single out a bird which flies to the left, and him on the right a bird to the right, that you may not interrupt each other, nor both shoot at the same bird, and readily fire at the first aim. Let each of you mark the fall of his bird, and immediately run to the place; and if the dog do not secure it, or the bird should be only wounded, and have run, put him upon the scent; but if your dog understand his business, and will fetch his game, it is better to trust to him, and load again as quick as you can. It will always be of great use, and save much time and trouble, to have a person without a gun, to mark the flight of the birds.

If a single bird be sprung, let him take the shoot to whose side it flies: the bird being killed, cause your dog to lie by it whilst you load, lest he spring other birds that are near you.

If you trace the birds to a hedge, double the row by walking one on each side, taking your dog on the ditch side: here, if you have a spaniel, he will be of great use; as you may make him go along in the ditch, and your pointer on the other side; by which means you will not pass a bird, and one of you will most likely get a good shoot at it. Your own judgment, with very little experience, will best direct where the birds are most likely to be found at different times of the day, according to the grounds you have to hunt in.

A fowling-piece should not be fired more than twenty or five-and-twenty times without being washed; a barrel, when foul, neither shoots so ready, nor carries the shot so far as when clean. The flint, pan, and hammer, should be well wiped after each shot; this contributes greatly to make the piece go off quick, but then it should be done with such expedition, that the barrel may be reloaded whilst warm. The flint should be frequently changed, without waiting till it misses fire before a new one is put in. Fifteen or eighteen shots, therefore, should only be fired with the same flint; the expense is too trifling to be regarded, and by changing it thus often, much vexation will be prevented. A gun, also, should never be fired with the prime of the preceding day; it may happen that an old priming will sometimes go off well, but it will more frequently contract moisture and fuze in the firing; then the object will most probably be missed, and that because the piece was not fresh primed.

Some attention is requisite in loading a piece; the powder should be only slightly rammed down, for which purpose, it is sufficient to press the ramrod two or three times on the wadding, and not (as the usual practice is) to ram down the wadding by main force, by drawing up the ramrod, and then returning it into the barrel with a jerk of the arm, many successive times. For, by compressing the powder in this violent manner, some of the grains will necessarily be bruised,

whilst the explosion will not be so quick, and the shot will be spread wider.

In pouring the charge of powder into the barrel, care should be taken to hold the measure as much as possible in a perpendicular line, that the powder may the more readily fall to the bottom. It is even of service to strike the butt end of the gun gently on the ground, in order to detach those grains of powder, which, in falling down, adhere to the sides of the barrel.

The shot should never be rammed down tight: after having given a stroke on the ground with the butt-end of the gun, in order to settle it, the same as for the powder, the wadding should then be gently put down, but much less close than that over the powder; for, when the shot is wadded too tight, it spreads wide, and the piece will recoil. In this, therefore, as well as in every other mode of loading, the sportsman should never carry his gun under his arm, with the muzzle inclined to the ground; that practice at all times loosens the wadding and charge too much: sometimes produces the loss of shot, and always indicates laziness in the shooter, and indifference to the sport.

When the piece is fired, it should, if possible, be reloaded immediately, whilst the barrel is warm, lest, by delaying it, a certain moisture should be formed in the barrel, which would retain a part of the powder when pouring in the charge, and hinder it from falling to the bottom. Powder, also, will imbibe moisture from the air, and, therefore, it is of additional advantage to load the piece whilst the barrel is warm, because some part of the moisture will be thereby evaporated. For the same reason, the sportsman should fire off a little powder before he loads the first time; for it has been found, even in the driest seasons, that the coldness of the barrel, and perhaps some little moisture condensed in its cavity, have sensibly diminished the force of the powder in the first discharge.

Some sportsmen prime before they load; this may be proper when the touch-hole is enlarged, and the barrel is very thin at that place, because, in that case, if the piece is not first primed, it will in loading prime itself, which diminishes the charge; but, when the touch-hole is of its proper size, the piece should never be primed until after it is loaded; for then it will be known, from the few grains of powder which usually make their way into the pan, that the touch-hole is clear and unobstructed; and, on the contrary, if no grains come through, that it will be proper to strike the butt-end of the gun smartly with the hand, and to prick the touch-hole until they appear. But, whether the practice is to prime before or after loading the piece, it is highly proper, after every discharge, to prick the touch-hole, and what is still better, to guard against all remains of fuze or squib, by inserting into the touch-hole the feather of a partridge's wing, which will not only clear it of these dangerous remains, but, if the piece is delayed to be re-charged, will take away all humidity that may be contracted there.

Every sportsman has his own manner of bringing his gun up to his shoulder, and of taking aim; and each follows his own fancy with respect to the stock of his fowling-piece, and its shape. Some like it long, others short; one prefers it straight, another bent. And, although there are some sportsmen, who shoot equally well with pieces stocked in different ways and shapes, yet certain principles may be laid down, as well upon what is the proper length, as upon the proper bent, that the stock of a gun should have. But in the application, such principles are very frequently, nay, most commonly, counteracted, by the whim or the particular convenience of the shooter. Generally speaking, however, it is certain, that, for a tall, long-armed man, the stock of a gun should be longer than for one of a less stature and shorter arm. That a straight stock is proper for him who has high shoulders, and a short neck; for, if it be much bent, it would be very difficult for him, especially in the quick motion required in shooting at a flying or running object, to place the butt of the gun-stock firmly to the shoulder; the upper part alone would in general be fixed, which would not only raise the muzzle, and consequently shoot high, but make the recoil more sensibly felt, than if the whole end of the stock were firmly placed on the shoulder. Besides, supposing the sportsman to bring the butt home to his shoulder, he would scarcely be able to level his piece at the object. On the contrary, a man with low shoulders, and a long neck, requires a stock much bent: for, if it is straight, he will, in the act of lowering his head to that place of the stock at which his cheek should rest, in taking aim, feel a constraint, which he never experiences, when, by the effect of the proper degree of bent, the stock lends him some assistance, and, as it were, meets his aim half-way.

Independently, however, of these principles, the application of which is subject to a variety of modifications, we venture to advise the sportsman in the choice of a fowling-piece, that a long stock is preferable to a short one, and, at the same time, rather more bent than usual; for a long stock sits firmer to the shoulder than a short one, and particularly so when the shooter is accustomed to place his left hand, which principally supports the piece, near to the entrance of the ramrod into the stock.

The practice of placing that hand near the bridge of the guard, is undoubtedly a bad one; the aim is never so sure, nor has the shooter such a ready command over his piece, as when he places his hand near the entrance of the ramrod, and, at the same time, strongly grasps the barrel; instead of resting it between his fore-finger and thumb, in conformity with the general custom. It may, therefore, be depended upon, that a stock bent a little more than ordinary is better for shooting true than one too straight, because the latter, in coming up to the aim, is subject to the inconvenience of causing the sportsman to shoot too high.—We would also advise him to have his fowling-piece a little elevated at the muzzle, and the sight small and flat; for the experienced well know, that it is more usual to shoot low than high. It is, therefore, of service that a piece should shoot a little high, and then, the more flat the sight, the better the line of aim will coincide with the line of fire, and in consequence the gun will be less liable to shoot low.

The method by which to avoid missing a cross-shot, whether it be flying or running, is not only to take aim before the object, but likewise not involuntarily to stop the motion of the arms, at the moment of pulling the trigger; for the instant the hand stops in order to fire, although the space of time be almost imperceptible, the object, if a bird, gets beyond the line of aim, and the shot will fly behind it; and if a hare or rabbit be shot at in this manner, whilst running, and especially if at a distance, the animal will only be slightly struck

in the buttocks, and will be taken but by hazard. When a bird, however, is flying in a straight line from the shooter, this fault can do no harm; the object can scarcely escape, if the piece be but tolerably well directed, unless, indeed, it is fired at the moment the game springs, and before the birds have taken a horizontal flight. In that case, if the hand stop ever so little at the instant of firing, the sportsman will shoot low, and inevitably miss the mark.

It becomes, therefore, extremely essential to accustom the hand, in taking aim, to follow the object, without suspending the motion in the least degree, which is a capital point towards acquiring the art of shooting well: the contrary habit, which is very difficult to correct, when once contracted, prevents that person from attaining perfection in the art, who, in other respects, may eminently possess quickness of sight and steadiness of aim.

Nor is it less essential in a cross-shot to aim before the object in proportion to its distance, at the time of firing. If a partridge, for instance, fly across at the distance of thirty or five-and-thirty paces, it will be sufficient to take aim at the head, or, at most, but a small space before. The same rule will nearly hold in the cases of shooting quails, woodcocks, pheasants, or wild ducks, although these birds move their wings slower than the partridge. But, if the object be fifty, sixty, or seventy paces distant, it then becomes necessary to aim at least half a foot before the head. The same practice should be observed in shooting at a hare or rabbit, when running in a cross direction, making due allowance for the distance, and for the swiftness of the pace, which is not always the same. It is also proper, in shooting at an object very distant, to take aim a little above it, because shots, as well as balls, have but a certain range in point blank, beyond which, each begins to describe the curve of the parabola.

When a hare runs in a straight line from the shooter, he should take his aim between the ears, otherwise he will run the hazard either of missing, or at least of not killing dead, or, as it is sometimes called, "clean." A true sportsman, who has the ambition of shooting well, is not content with only breaking the wing of a partridge, or the thigh of a hare, when he shoots at a fair distance: for, in such case, the hare, or the partridge, ought to be shot in such a manner that it should remain in the place where it falls, and not require the assistance of dogs to take it. But if he shoots at a great distance, it is no reproach that the partridge is only winged, or the hare wounded, so that it cannot escape.

Practice soon teaches the sportsman the proper distance at which he should shoot. The distance at which he ought infallibly to kill any kind of game, with patent shot (No. 3.) provided the aim be well taken, is from twenty-five to thirty-five paces for the footed, and from forty to forty-five paces for the winged game. Beyond this distance, even to fifty or fifty-five paces, both partridges and hares are sometimes killed, but, in general, hares are only slightly wounded, and carry away the shot; and partridges, at that distance, present so small a surface, that they frequently escape untouched between the vacant spaces of the circle. Yet it does not follow that a partridge may not be killed with No. 3, patent shot, at sixty, and even seventy paces distance; but then these shots are very rare.

Those who know the range of a fowling-piece, and the closeness of its shot, shrug up their shoulders at the romances of sportsmen, who, according to their own accounts, daily kill, with shot (No. 3) at the distance of ninety and one hundred paces. Nay, some even go so far as to assert, that they have killed, with this sized shot, hares at one hundred and ten paces, and pheasants at one hundred and twenty. It cannot, however, be denied, that with shot No. 5, a man may have killed a hare or a partridge at one hundred and ten, or possibly at one hundred and twenty paces; but then these shots are so extraordinary, and occur so seldom, that the whole life of a sportsman will scarcely afford more than two or three instances; and when it does happen, it will be found to be by a single pellet, which, by great chance, has hit either the wing or the head of the partridge, or has struck the head of the hare, by which it is stunned, or perhaps has penetrated the small part of the shoulder, where there is, to prevent the wound being mortal, only a very thin skin, which, being stretched by the animal in running, is thereby rendered more easy to be pierced with the shot.

For expertness in finding the game, a sportsman must pay attention to the difference of the seasons, and the weather; to the temperature of the air, and even to those hours of the day which are more or less favourable for shooting. In warm weather he should hunt for the game in plains and in open grounds, at the same time bearing in mind, that, during the heat of the day, the birds frequent moist places, marshes where there is little water and much high grass, the sides of rivers and brooks, and hills exposed to the north. But, in cold weather, they will most commonly be found on little hills exposed to the south, along hedgerows, among the heath, in stubbles, and in pastures where there is much furze and fern. In hard frosts they get into thickets, low places, and marshes, where they seek to shelter themselves from the cold, as well as the heat, in different seasons. The greatest part, however, of these rules, will only apply when the weather is extremely hot or severely cold, at both of which times the hares and partridges almost totally desert the plains and open grounds. The game is more easily approached, or, in the language of sporting, "lies better," in covert than in open places: a double advantage is therefore obtained by hunting for them in the former.

He should, at all times of the shooting season, go out in the morning before the dew is off. At that time the shepherds and their flocks, the husbandmen and their teams, have not entirely spread over the fields, and have as yet sprung but a small quantity of game; the scents of the preceding night will also be more warm, and the dogs will hit them off better. Besides, if he be not early, he loses such opportunities of shooting as he will not meet again during the remainder of the day. All these advantages, therefore, greatly counterbalance the notion generally received, that, as the birds will not lie well while the ground is wet, the sportsman should not go out early in the morning, or before the dew is gone off.

The colour of the dress which the shooter should wear is worthy notice. Green is unquestionably the best in the early part of the season, whilst the leaves remain on the trees. For, if he be clad in a glaring colour, when the face of the country retains its verdure, the game will perceive his approach more easily, and from a greater distance. In winter, for the same reason, his dress should be

composed of a dark brown, or some colour resembling that of the dead leaf.

It is best to hunt as much as possible against the wind, not only to prevent the game from perceiving the approach of the sportsman and his dog, but also to enable the dog to scent the game at a greater distance. We say as much as possible, because in advancing and returning upon his steps, in order to range the ground well, the shooter cannot always keep the advantage of the wind. When, therefore, it is proposed to hunt any particular tract of country, in which game is expected to be found, it is indispensably necessary to take the wind, and it behoves the shooter to range and quarter his ground in such manner and direction as to preserve it in his favour.

He should never be discouraged from hunting and ranging the same ground over and over again, especially in places covered with heath, brambles, high grass, or young coppice-wood. A hare or rabbit will frequently suffer him to pass several times within a few yards of its form, without getting up. He should be still more patient, when he has marked partridges into such places; for it often happens, that, after the birds have been sprung many times, they lie so dead, that they will suffer him almost to tread upon them before they will rise. Pheasants, quails, and woodcocks, do the same.

He should always keep a sharp eye, and carefully look about him, never passing a bush or a tuft of grass without examination; but he should never strike either with the muzzle of his gun, for the reasons assigned where we speak of wadding. It is also proper to stop every now and then; for this interruption of motion frequently determines the game to spring, which would otherwise have suffered him to pass. He who patiently beats and ranges his ground over and over again, without being discouraged, will always kill the greatest quantity of game; and, if he be shooting in company, he will find game where others have passed without discovering any. As soon as he has fired, he should call in his dog, and make him lie down until he has re-loaded his piece; for, without this precaution, he will frequently have the mortification to see the game rise when he is not prepared to shoot.

In shooting in an open country, one of the most essential points to be observed is, to mark the place where the partridges alight; therefore, when he has killed his bird, he should not immediately run to pick it up, or attend to make his dog bring it to him, but he ought to follow the others with his eye, until he sees them settle, or as far as his sight can extend, without interruption from a wood or a hedge. In the latter case, although he have not been able to distinguish the exact spot on which they have alighted, yet he may tolerably well guess whereabout they are, especially if acquainted with the country in which he is shooting. And, when two or more sportsmen shoot in company, each should mark the birds which fly on his own side.—These general rules will, with equal propriety, apply to all game of course or feather.

We might next proceed to the detail of particular directions for hare and rabbit, partridge, pheasant, grouse, woodcock, snipe, and wild fowl shooting; but as these would draw this article to too great a length, we shall conclude it with a few observations respecting guns, powder, and shot.

To make Gun Barrels of a fine brown Colour.—As a brown barrel seems to be the most pleasing to a sportsman, the following is a certain and easy method of giving it this hue.

Rub your barrel bright with sand paper, or if bright scour it with dry brickdust to take off all greasiness, and fit a stick or piece of wood into the muzzle long enough to hold it by.

Bruise roughly about half an ounce of stone-brimstone, and sprinkle it over a gentle fire either of wood, or coal, or charcoal; hold your barrel over the smoke, turning and drawing it backward and forward until it be equally tinged all over; this done, set it in a cellar or damp room till next day, in which time you will find it has thrown out a fine rust, over which you may draw your finger to spread it even, and let it stand another day. If you perceive any parts that have not taken the rust, scour such parts bright, and repeat the above operation.

It is then to be polished with a hard brush, (first rubbed with bees-wax,) and afterwards with a dry woollen or rough linen rag, which will make it look of a beautiful brown colour. This rubbing must be repeated every day so long as it throws out any roughness. No oil or grease should come on it for some time, as that may bring off the rust in places; but if by neglect it should get so strong a roughness, that you cannot get it down with common rubbing, in that case wipe it over with sweet oil, and rub it off gently with a clean linen rag, and the next day you may polish it down with your brush, as before directed.

Directions for keeping your Guns in order.—If your lock and furniture be bright, the best way to save the trouble, as well as to prevent the damage that may be done by unskilful polishing, is never to suffer them to rust, which may easily be prevented by frequently rubbing all the bright parts with a small brush, dipped in sweet oil, which should be well rubbed off with a linen rag: and this should never be neglected both before and after using it.

It is needless to take the lock often to pieces: if you take it off and brush it with plenty of oil, and pull up the cock and hammer a few times, the dirt with the oil will work itself out, which is to be wiped off, and a little clean oil put on those parts where there is any friction will answer the purpose.

To wash out the Barrel.—Fill it either with cold or warm water, and empty it, and let it stand a few minutes, and the air and moisture will soften the soil left from the firing of the powder, so as to come off the easier. You may use sand with your rag or tow to wash it out, which will remove any of the soil that sticks hard to it without hurting its smoothness. Care must be taken to wipe it very dry, and if it is to be set by for a time, it will be proper to wipe it out with an oily rag, and to stop the muzzle with the same, otherwise it will be apt to rust.

Of the Stock, Lock, &c.—The wood which is most commonly employed for the stock, and which appears the best for the purpose, is walnut. It is only necessary, however, to observe, that the grain be even and close, and as free as possible from knots and burs, which, though they may add to the beauty of the stock, seldom fail to take away from its strength, unless they are confined entirely to the butt part. As to the curvature, no particular degree can be assigned as a standard; different persons requiring different degrees, according to the length of their neck, and to the manner in which they hold their head whilst taking aim. This, however, as well as the length of the butt, which depends partly upon the circum-

stances just mentioned, but chiefly upon the length of the arms, can be determined with great accuracy by the gunsmith, from observing the manner in which the shooter presents his piece and takes his aim.

With regard to the locks, we shall only observe that the genius and industry of the English workmen have already brought them to such a degree of elegance and perfection, that we have scarcely any thing farther to hope for, or require. The real improvements are not confined to any particular maker; and, though the minutiæ peculiar to each may determine the purchaser in his preference, no person need fear much disappointment in the essential qualities of a lock, provided he goes to the price of a good one. It is of much more consequence to the excellence of a lock, that the springs be proportioned to each other, than that they should all be made very strong. A moderate degree of force is sufficient to produce the required effect; and whatever exceeds this proves detrimental, by rendering the trigger difficult to draw, or producing such a stroke as breaks the flints, or throws the piece from the direction in which it was pointed. If the main-spring be very strong, and the hammer-spring weak, the cock is often broken for want of sufficient resistance to its stroke, until it is stopped all at once by the check of the lock-plate. Whilst, on the other hand, if the hammer-spring be stiff, and the main-spring weak, the cock has not sufficient force to drive back the hammer. And, in both cases, the collision between the flint and steel is too slight to produce the necessary fire. The face of the hammer, also, may be too hard or too soft. The former is known by the flint making scarcely any impression upon it, and the sparks being few and very small. The latter, by the flint cutting deep into the hammer at every stroke, whilst the sparks are also few in number, and of a dull red colour. When the strength of the springs, and the temper of the hammer, are in due degree, the sparks are numerous, brilliant, and accompanied with a considerable whizzing noise.

To explain these differences, it is necessary to observe, that the sparks produced by the collision of flint and steel are particles of the metal driven off in a strongly-heated state, and which, falling among the powder, inflame it instantly. By snapping a gun or pistol over a sheet of white paper, we may collect these sparks, and, by submitting them to a microscope, demonstrate the fact. If the sparks be very brilliant, and accompanied with a whizzing noise, we shall find the particles collected on the paper to be little globules of steel, which have not only been melted, but have actually undergone a considerable degree of vitrification from the intensity of the heat excited by the collision, their surface exactly resembling the slag thrown out from an iron foundery. When the face of the hammer is too hard, the particles which the flint strikes off are so small, that they are cooled before they fall into the pan; and, when the hammer is too soft, the particles driven off are so large as not to be sufficiently heated to fire the powder.

We think the conical form of the touch-hole a real improvement; but do not approve of its widening so much as it does in the patent-breech, as the force of the fuse against the opening into the pan is greatly increased by it. Gold pans are of very little advantage; for, as the iron must be softened before they can be applied, it is very liable to rust, and thus destroy its connection with the gold; the tin, also, by means of which the gold lining is fixed, is frequently melted by the fire of the fuse being directed upon the bottom of the pan, and the gold thereby detached from its hold; this will happen more readily when the touch-hole is placed very low, and when, from its form or width, the fire of the fuse is considerable. A great improvement, however, has lately been made in the manner of putting in the gold pans; they are now dove-tailed in before the lock-plate is hardened, by which means they seldom or never blow out; and it is now found that they will stand better than any other species of pan, provided the lock is eased from the touch-hole, or taken off when the barrel is taken out of the stock. Still we are of opinion that the steel pan will be found, with common care in cleaning it, to last as long, and to answer every purpose as well, as when lined with gold. See SHOOTING.

Of the Choice of Gunpowder.—The excellence of this article as to its properties, and the relative condition in which it is at the time of using it, with respect to dryness, dampness, or age, are in themselves circumstances so obviously important to the sportsman, that we have often been astonished at the almost total neglect which attends this part of the shooting science: but he may henceforward be assured, that, without the utmost circumspection and care herein, his high-priced fowling-piece will but little avail him; mortification and disgust will generally ensue, and the gunsmith too frequently be blamed for the fault which the sportsman alone has created by his own neglect.

Gunpowder is composed of very light charcoal, sulphur, and well-refined saltpetre. The powder used by sportsmen in shooting game is generally composed of six parts of saltpetre, one of charcoal, and one of sulphur; but these proportions, as well as the introduction of other ingredients, and the sizes of the grains, are undoubtedly varied by the different manufacturers in the composition of the powders of the same denomination, and are always kept profoundly secret.

Powder, however well dried and fabricated it may have been, loses its strength when allowed to become damp. If daily observations on powder put into damp magazines, and carefully preserved in barrels, are not sufficient to establish this fact, the following experiment will render it incontestable:—Let a quantity of well-dried powder be nicely weighed, and put into a close room, where the air is temperate, and seemingly dry, and be left for three or four hours; on weighing it again, its weight will be increased. This same powder, exposed to an air loaded with vapour, acquires much additional weight in a short time. Now the increase of the weight being proportional to the quantity of vapour contained in the atmosphere, and to the length of time that the powder is exposed to it; it follows, that powder easily attracts moisture. Wherefore, if a degree of heat sufficient only to fire dry powder be applied to powder that is damp, the moisture will oppose the action of the fire, and the grains either will not take fire at all, or their inflammation will be slower; thus, as the fire will spread more slowly, fewer grains will burn; and the penetration of the fire from the surface to the centre of each grain, and, consequently, their consumption, will require more time. Whence it may be concluded, that all degrees of moisture diminish the force of powder. Saltpetre, not sufficiently refined, attracts moisture very readily; and as the substances that render it

impure lessen the quantity of fluid, and prevent its detonation, it should be refined as much as possible before it is employed in the fabrication of gunpowder.

The force of powder is owing to an elastic fluid generated at the explosion, the suddenness of which depends upon the proportion of the ingredients, the contact between the nitrous and combustible particles, and the size of the grains, &c. Hence it may be concluded, that when several powders, equally well dried, and fired under the same state of the atmosphere, are compared together, that which produces the greatest quantity of the elastic fluid, in a given space of time, is the strongest.

There are two general methods of examining gunpowder; one with regard to the purity of its composition, the other with regard to its strength. Its purity is known by laying two or three little heaps near each other upon white paper, and firing one of them. For if this takes fire readily, and the smoke rises upright, without leaving any dross or feculent matter behind, and without burning the paper, or firing the other heaps, it is esteemed a sign that the sulphur and nitre were well purified, that the coal was good, and that the three ingredients were thoroughly incorporated together: but, if the other heaps also take fire at the same time, it is presumed, that either common salt was mixed with the nitre, or that the coal was not well ground, or the whole mass not well beat and mixed together; and, if either the nitre or sulphur be not well purified, the paper will be black or spotted.

For proving the strength of gunpowder, a number of machines have been invented, all of which are liable to many objections, and, upon trial with the same powder, are found to give results so different, that no dependence can be placed in them; to so many modifications are the principal properties of powder subject, even in experiments conducted with the utmost care. These variations have been attributed, by many, to the different density of the atmosphere at the time of the different experiments; but the opinions upon this matter are so improbable in themselves, and so contradictory to each other, that they claim neither attention nor belief. Thus, some will have it that gunpowder produces the greatest effect in the morning and evening, when the air is cool and dense; whilst others assert, that its force is greatest in sunshine, and during the heat of the day. Mr. Robins concludes from the result of several hundred trials, made by him at all times of the day, and in every season of the year, that the density of the atmosphere has no effect in this matter, and that we ought to attribute the variations observed at these times to some other cause than the state of the air: probably they are owing to the imperfection of the instrument, or to the manner in which the trial was conducted. In this state of uncertainty, then, upon the theory of the effects of gunpowder, we remain at this day.

If experiments, however, are made with the prover, great care must be taken not to press the powder in the smallest degree into the tube, but to pour it gently in; and, particularly in trying the strength of different powders, which is the best use to which the instrument, imperfect as it is, can be applied, attention must be paid, that one powder is not pressed closer than another at each experiment, nor the successive experiments made until the prover is cool, otherwise no comparative certainty can be gained. By far the most certain method, however, of determining the quality of powder, is by drying some of it very well, and then trying how many sheets of paper it will drive the shot through, at the distance of ten or twelve yards. In this trial we should be careful to employ the same sized shot in each experiment, the quantity both of the shot and the powder being regulated by exact weight; otherwise we cannot, even in this experiment, arrive to any certainty in comparing the strength of different powders, or of the same powder at different times.

Powder ought to be kept very dry; every degree of moisture injures it. Good powder, however, does not readily imbibe moisture; and, perhaps, there is no greater proof of the bad quality of powder, than its growing damp quickly when exposed to the air: this readiness to become moist depends upon the saltpetre employed in the composition not having been freed from the common salt it contains in its crude state, and which, in consequence, has a strong attraction for watery particles.

Powder may acquire a small degree of dampness, and be freed from it again by drying, without much injury to its quality. But, if the moisture is considerable, the saltpetre is dissolved, and the intimate mixture of the ingredients thereby entirely destroyed. Drying powder with too great a heat also injures it; for there is a degree of heat, which, although not sufficient to fire the powder, will yet dissipate the sulphur, and impair the composition by destroying the texture of the grains. The heat of the sun is, perhaps, the greatest it can with safety be exposed to, and, if properly managed, is sufficient for the purpose: when this cannot be had, the heat of a fire, regulated to the same degree, may be employed; and for this end, a heated pewter plate is perhaps as good as any thing, because pewter retains so moderate a heat, that there can be little danger of spoiling the powder by producing the consequences beforementioned.

It is observable, that damp powder produces a remarkable foulness in the fowling-piece after firing, much beyond what arises from an equal quantity of dry powder; and this seems to arise from the diminution of the activity of the fire in the explosion. Unless the sportsman is very particular indeed in the mode of keeping his powder, we would recommend him always to air it and his flask, before he takes the field. Flasks made of copper or tin are much better for keeping powder in, than those made of leather, or than small casks: the necks of these should be small, and well stopped with cork.

After this dissertation on gunpowder, it will naturally be expected that we point out to the sportsman the best powder for shooting; for this purpose we shall recommend the Dartford powder of Messrs. Pigou and Andrews, for being not only stronger, but the cleanest in burning and the quickest in firing, of any other at this time manufactured in the kingdom; and we also venture to give it as our opinion, that the manufacturers of this powder seem to have attained, as nearly as any purpose can require, that accuracy of granulation, and of the proportions and qualities of all the ingredients, which most readily produces the destruction of all the composition, and yields the greatest possible quantity of the permanent elastic fluid in a given time; which properties alone can constitute powder of the best quality.

Of Shot.—The choice of this article is highly worthy of the sportsman's care. It should be

equal, round, and void of cavities. The patent milled shot is, at this time, to be preferred to all other sorts, and is in such general use, that the instructions which here follow on the size of the shot to be adopted in the different chases must be understood to relate to the patent shot only.

It is extremely important for the success of the chase, that the sportsman should proportion the size of his shot, as well to the particular species of game he means to pursue as to the season of killing it. Thus, in the first month of partridge shooting, shot No. 1. should be used; for since, at this time, the birds spring near at hand, and we seldom fire at more than the distance of forty paces, if the shooter takes his aim but tolerably well, it is almost impossible for a bird at this distance to escape in the circle, or disk, which the shot forms. Hares also, at this season of the year, sit closer; and, being at this time thinly covered with fur, may easily be killed with this sized shot at thirty or thirty-five paces. In snipe and quail shooting, this sized shot is peculiarly proper; for, in using a larger size, however true the sportsman may shoot, yet he will frequently miss; the objects being so small, that they have great chance of escaping in the vacant spaces of the circle or disk. Yet there are many sportsmen who shoot snipes, quails, and field-fares, in countries where they abound, with the sizes six and seven of the common shot, the last of which is called mustard-seed.

About the beginning of October, at which time the partridges are stronger in the wing, No. 3. is the proper shot to be used. This size seems to be the best of any; it preserves a proper medium between shot too large, and that which is too small, and will kill a hare from the distance of thirty-five to forty paces, and a partridge at fifty, provided the powder be good. It will serve also for rabbit-shooting. In short, it is excellent for all seasons, and many sportsmen use no other the season round. It is true, that distant objects are frequently missed for the want of larger shot; but then these bear no proportion to the number which are daily missed by using shot of too large a size, especially with the feathered game. If a man were to shoot constantly with shot No. 5, for one partridge which he might chance to kill with a single pellet, at the distance of eighty paces, he would miss twenty birds at fifty paces which would in such case escape in the vacant spaces of the circle. But if the sportsman expressly proposes to shoot wild-ducks, or hares, then, indeed, he had better use the No. 5. However, in shooting with a double-barrelled gun, it may be prudent to load one of the barrels with large shot, for the necessary occasions; and, in any case large shot is required, No. 5. will be found to be better than any other; for its size is not so large as to prevent it from sufficiently garnishing, or being equally spread in the circle, and it can at the same time perform, in effect, all that a larger-sized shot can do, which garnishes but very little, if any at all.

In order, therefore, to shew clearly, at one view, the comparative difference in the garnishing of shot of different sizes, we here subjoin a table, which indicates the number of pellets precisely composing an ounce weight of each sort of shot.

PATENT SHOT.

No. B. B.	1 ounce - -	60
B.	id. - -	67
1.	id. - -	86
2.	id. - -	109
3.	1 ounce - -	160
4.	id. - -	200
5.	id. - -	256
6.	id. - -	444
7.	id. - -	530
8.	id. - -	600

COMMON SHOT.

No. 7.	1 ounce - -	350
6.	id. - -	260
5.	id. - -	235
4.	id. - -	190
3.	id. - -	140
2.	id. - -	110
1.	id. - -	95

The Proportions of Powder and Shot in the Charge.—To find the charge that gives the longest range in fowling-pieces of different dimensions, must be allowed to be a discovery of infinite importance to every sportsman; and, as it seems to be an opinion pretty generally received and established, that every barrel has a particular load (not a measure estimated by any rules to be drawn from a comparison made between the proportions of the caliber and the length of the barrel) with which it will shoot with greater certainty and effect: it cannot be doubted that he will make some experiments with his own barrels, in order to attain this end. Before we proceed, therefore, to lay down rules for the loading of fowling pieces of different dimensions, we beg leave to engraft an excellent principle in the practice of the artillery on this point, upon the shooting-science. It is asserted, that by using small charges at first, and increasing the quantity of powder by degrees, the ranges will increase to a certain point; after which, if the charge be augmented, they will progressively diminish; though the recoil will still continue in the ratio of the increase of the charge. This is a consequence that may be deduced from a variety of experiments, and is perfectly agreeable to the principles of mechanics; since the recoil and the range ought to be in the reciprocal ratio of the gun and the shot, making allowance for the resistance which these bodies meet with.

For a fowling-piece of a common caliber, which is from twenty-four to thirty balls to the pound weight; a drachm and a quarter, or, at most, a drachm and a half, of good powder; and an ounce, or an ounce and a quarter, of shot, is sufficient. But when shot of a larger size is used, such as No. 5. the charge of shot may be increased one-fourth, for the purpose of counterbalancing, in some degree, what the size of the shot loses in the number of pellets, and also to enable it to garnish the more. For this purpose the sportsman will find a measure marked with the proper gauges very convenient to him. An instrument of this nature may now be purchased at most of our locksmiths.

Different opinions, however, are entertained on the proportions of the charge. Some determine the charge of a fowling-piece by the weight of a ball of the exact size of the caliber; estimating the weight of the powder at one-third of that of the ball, whether it is proposed to shoot with ball or with shot; and the weight of the shot they estimate at a moiety more, or, at the most, at double the weight of the ball. This calculation comes pretty near to the propositions we have just laid down, except in the difference of size between the calibers twenty-four and thirty,

which, notwithstanding, is not sufficiently great in the two cases to require a gradation in the weight of the charge.

Others again lay down as a rule for the charge of powder, a measure of the same diameter as the barrel: and double that diameter in depth: and, for the shot, a measure of the like diameter, but one-third less in depth than that for the powder; this also agrees tolerably well with the proportions we have mentioned, at least for the powder, but the measure of shot seems to be too small. In shooting with a rifle-piece, some persons proportion the quantity of powder to three times the quantity which the mould of the ball adapted to the piece will contain.

Although proverbs are generally true, or at least possess some portion of truth, yet nothing is so glaringly absurd, or less founded in rational principles, than that old adage, "Sparing of powder, and liberal of shot:" a saying, which is not only in the acquaintance, but in the constant practice, of most sportsmen.

As a consequence of overloading with shot, the powder has not sufficient strength to throw it to its proper distance; for, if the object be distant, one half of the pellets composing the charge, by their too great quantity and weight, will strike against each other, and fall by the way; and those which reach the mark will have small force, and will produce but little or no effect. Thus to overload is the strange fancy of poachers, who imagine they cannot kill unless they put two ounces, or more, of large shot into their pieces. It is true, that they destroy a great quantity of game, but then it is not fairly shot. Such men are in some measure punished by the severe strokes they receive on the shoulders and cheeks, in consequence of the excessive recoil. For the method of casting shot, see SHOT; and for the rest, see FOWLING-PIECE, DOGS, SPORTING, POINTERS, and SPANIELS.

SHOP. *s.* (rceop, Sax. a magazine.) 1. A place where any thing is sold (*Shakspeare*). 2. A room in which manufactures are carried on (*Bacon*).

SHO'PBOARD. *s.* (*shop* and *board.*) Bench or table on which any work is done (*South*).

SHO'PBOOK. *s.* (*shop* and *book.*) Book in which a tradesman keeps his accounts (*Locke*).

SHO'PKEEPER. *s.* (*shop* and *keep.*) A trader who sells in a shop; not a merchant, who only deals by wholesale (*Addison*).

SHOPLIFTER, one who steals goods privately out of a shop.

SHO'PMAN. *s.* (*shop* and *man.*) A petty trader (*Dryden*).

SHORE. The preterit of *shear.*

SHORE. *s.* (rcopɛ, Saxon.) 1. The coast of the sea (*Milton*). 2. The bank of a river (*Spenser*). 3. A drain; properly *sewer.* 4. (*schooren*, Dutch, to prop.) The support of a building; a buttress (*Wotton*).

To SHORE. *v. a.* (*schooren*, Dutch.) 1. To prop; to support (*Watts*). 2. To set on shore: not in use.

SHORE (Jane), the celebrated concubine of the licentious king Edward IV. was the wife of Mr. Matthew Shore, a goldsmith in Lombard-street, London. Kings are seldom unsuccessful in their amorous pursuits; therefore there was nothing wonderful in Mrs. Shore's removing from Lombard-street to shine at court as the royal favourite. Historians represent her as extremely beautiful, remarkably cheerful, and of a most uncommon generosity. The king, it is said, was no less captivated with her temper than with her person: she never made use of her influence over him to the prejudice of any person; and if ever she importuned him, it was in favour of the unfortunate. After the death of Edward, she attached herself to the lord Hastings; and when Richard III. cut off that nobleman as an obstacle to his ambitious schemes, Jane Shore was arrested as an accomplice, on the ridiculous accusation of witchcraft. This, however, terminated only in a public penance; excepting that Richard rifled her of all her little property; but whatever severity might have been exercised towards her, it appears that she was alive, though sufficiently wretched, under the reign of Henry VIII. when sir Thomas More saw her poor, old, and shrivelled, without the least trace of her former beauty. Mr. Rowe, in his tragedy of Jane Shore, has adopted the popular story related in the old historical ballad, of her perishing by hunger in a ditch where Shoreditch now stands. But Stow assures us that street was so named before her time.

SHO'RELESS. *a.* Without a coast.

SHOREHAM, a borough in Sussex, with a market on Saturday. It is commonly called New Shoreham, to distinguish it from the Old, which lies near it, and is now of little account. It stands on an arm of the sea, into which vessels can enter with the tide; and many small vessels are built here. It is 19 miles W.N.W. of Newhaven, and 56 S. by W. of London.

SHORL, in mineralogy. See SCORLUS.

SHORLITE, or SCHORLITE, in mineralogy, a species of gem of a greenish or yellowish-white colour, for which see GEMMA.

SHORLING and MORLING, are words to distinguish fells of sheep; shorling being the fells after the fleeces are shorn off the sheep's back; and morling, the fells flayed off after they die or are killed. In some parts of England they understand by a shorling, a sheep whose face is shorn off; and by a morling, a sheep that dies.

SHORN. The participle passive of *shear.*

SHORT. *a.* (rceopt, Sax.) 1. Not long; commonly, not long enough (*Pope*). 2. Not long in space or extent (*Dryden*). 3. Not long in time or duration (*Dryden*). 4. Repeated by quick iterations (*Smith*). 5. Not adequate; not equal (*Addison*). 6. Defective; imperfect; not attaining the end; not reaching the intended point (*Locke*). 7. Not far distant in time (*Clarendon*). 8. Scanty; wanting (*Hayward*). 9. Not fetching a compass (*L'Estrange*). 10. Not going so far as was intended (*Dryden*). 11. Defective as to quantity (*Dryden*). 12. Narrow; contracted (*Burnet*). 13. Brittle; friable (*Walton*). 14. Not bending (*Dryden*).

SHORT. *s.* (from the adjective.) A summary account (*Shakspeare*).

SHORT. *ad.* Not long (*Dryden*).

SHORT (James), an eminent optician, was born in Edinburgh on the 10th of June, O. S. in the year 1710. At ten years of age, having lost his father and mother, and being left in a state of indigence, he was received into Heriot's Hospital, where he soon displayed his mechanical genius in constructing for himself little chests, book-cases, and other conveniences, with such tools as fell in his way. At the age of twelve he was removed from the Hospital to the High School, where he showed a considerable taste for classical literature, and generally kept at the head of his forms. In the year 1726 he was entered into the university, where he passed through the usual course of education, and took his master's degree with great applause.

By his friends he was intended for the church; but after attending a course of theological lectures, his mind revolted from a profession which he thought little suited to his talents: and he devoted his whole time to mathematical and mechanical pursuits. He had been fortunate enough to have the celebrated M'Laurin for his preceptor; who having soon discovered the bent of his genius, and made a proper estimate of the extent of his capacity, encouraged him to prosecute those studies in which nature had qualified him to make the greatest figure. Under the eye of that eminent master, he began in 1732 to construct Gregorian telescopes; and, as the professor observed in a letter to Dr. Jurin, "by taking care of the figure of his specula, he was enabled to give them larger apertures, and to carry them to greater perfection, than had ever been done before him."

In the year 1736 Mr. Short was called to London, at the desire of queen Caroline, to give instructions in mathematics to William duke of Cumberland; and immediately on his appointment to that very honourable office he was elected a fellow of the royal society, and patronised by the earls of Morton and Macclesfield. In the year 1739 he accompanied the former of those noble lords to the Orkney Isles, where he was employed in adjusting the geography of that part of Scotland: and happy it was for him that he was so employed, as he might otherwise have been involved in a scuffle which took place between the retainers of sir James Stewart of Barra and the attendants of the earl, in which some of the latter were dangerously wounded.

Mr. Short having returned to London, and finally established himself there in the line of his profession, was in 1743 employed by lord Thomas Spencer to make for him a reflector of twelve feet focus, for which he received 600 guineas. He made several other telescopes of the same focal distance with greater improvements and higher magnifiers; and in 1752 finished one for the king of Spain, for which, with its whole apparatus, he received 1200l. This was the noblest instrument of the kind that had then been constructed, and perhaps it has never yet been surpassed except by the astonishing reflectors of Herschel. See TELESCOPE.

Mr. Short was wont to visit the place of his nativity once every two or three years during his residence in London, and in 1766 he visited it for the last time. On the 15th of June 1768 he died, after a very short illness, at Newington Butts, near London, of a mortification in his bowels, and was buried on the 22d of the same month, having completed, within a few days, his fifty-eighth year. He left a fortune of about 20,000l. of which 15,000l. was bequeathed to two nephews, and the rest in legacies to his friends. In gratitude for the steady patronage of the earl of Morton, he left to his daughter the lady Mary Douglas, afterwards countess of Aboyne, 1000l. and the reversion of his fortune, should his nephews die without issue; but this reversionary legacy the lady, at the desire of her father, generously relinquished by a deed in favour of Mr. Short's brother Mr. Thomas Short and his children. Mr. Short's eminence as an artist is universally known, and we have often heard him spoken of by those who had known him from his youth, as a man of virtue and of very amiable manners.

SHORT-OCTAVES. An appellation given to some of the lower octaves of an organ, because, from the omission of some of the intermediate notes, the extreme keys lie nearer to each other than those of the full octaves.

To SHO'RTEN. *v. a.* (from *short.*) 1. To make short, either in time or space (*Hooker*). 2. To contract; to abbreviate (*Suckling*). 3. To confine; to hinder from progression (*Shakspeare*). 4. To lop (*Dryden*).

SHO'RTHAND. *s.* (*short* and *hand.*) A method of writing in compendious characters. See STENOGRAPHY.

SHO'RTLIVED. *a.* (*short* and *live.*) Not living or lasting long (*Addison*).

SHO'RTLY. *ad.* (from *short.*) 1. Quickly; soon; in a little time (*Calamy*). 2. In a few words; briefly (*Pope*).

SHO'RTNESS. *s.* (from *short.*) 1. The quality of being short, either in time or space (*Bacon*). 2. Fewness of words; brevity; conciseness (*Hooker*). 3. Want of reach; want of capacity (*Bacon*). 4 Deficience; imperfection (*Glanville*).

SHO'RTRIBS. *s.* (*short* and *ribs.*) The bastard ribs; the ribs below the sternum (*Wiseman*).

SHORTSI'GHTED. *a.* (*short* and *sight.*) 1. Unable by the convexity of the eye to see far (*Newton*). 2. Unable by intellectual sight to see far (*Denham*).

SHORTSI'GHTEDNESS. *s.* (*short* and *sight.*) 1. Defect of sight, proceeding from the convexity of the eye. 2. Defect of intellectual sight (*Addison*).

SHORTSIGHTEDNESS. (*myopia.*) A defect in the conformation of the eye, when the crystalline, &c. being too convex, the rays that enter the eye are refracted too much, and made to

converge too fast, so as to unite before they reach the retina, by which means vision is rendered dim and confused.

It it commonly thought that shortsightedness wears off in old age, on account of the eye becoming flatter; but Dr. Smith questions whether this be matter of fact, or only hypothesis. It is remarkable that shortsighted persons commonly write a small hand, and love a small print, because they can see more of it at one view. That it is customary with them not to look at the person they converse with, because they cannot well see the motion of his eyes and features, and are therefore attentive to his words only. That they see more distinctly, and somewhat farther off, by a strong light, than by a weak one; because a strong light causes a contraction of the pupil, and consequently of the pencils, both here and at the retina, which lessens their mixture, and consequently the apparent confusion; and therefore, to see more distinctly, they almost close their eyelids, for which reason they were anciently called *myopes*. Smith's Optics, vol. 2. Rem. p. 10.

Dr. Jurin observes, that persons who are much and long accustomed to view objects at small distances, as students in general, watchmakers, engravers, painters in miniature, &c. see better at small distances, and worse at great distances, than other people. And he gives the reasons, from the mechanical effect of habit in the eye. Essay on Dist. and Indist. Vision.

The ordinary remedy for shortsightedness is a concave lens, held before the eye; for this causing the rays to diverge, or at least diminishing much of their convergency, it makes a compensation for the too great convexity of the crystalline. Dr. Hook suggests another remedy; which is to employ a convex glass, in a position between the object and the eye, by means of which, the object may be made to appear at any distance from the eye, and so the eye be made to contemplate the picture in the same manner as if the object itself were in its place. But here unfortunately the image will appear inverted: for this however he has some whimsical expedients; viz. in reading to turn the book upside down, and to learn to write upside down. As to distant objects, the Doctor asserts, from his own experience, that with a little practice in contemplating inverted objects, one gets as good an idea of them as if seen in their natural posture. But for more on this subject see our articles SIGHT and MYOPIA.

SHORTWA'ISTED. *a.* (*short* and *waist.*) Having a short body (*Dryden*).

SHORTWI'NDED. *a.* (*short* and *wind.*) Shortbreathed; asthmatic; breathing by quick and faint reciprocations (*May*).

SHORTWI'NGED. *a.* (*short* and *wing.*) Having short wings (*Dryden*).

SHO'RY. *a.* (from *shore.*) Lying near the coast (*Burnet*).

SHOT. The pret. and part. pass. of *shoot.*

SHOT. *s.* (*schot,* Dutch.) 1. The act of shooting (*Sidney*). 2. The missile weapon emitted by any instrument (*Dryden*). 3. The flight of a missile weapon (*Genesis*). 4. (*escot,* Fr.) A sum charged; a reckoning (*Dryden*).

SHOT, a denomination given to all sorts of balls for fire-arms; those for cannon being of iron, and those for guns, pistols, &c. of lead.

SHOT (Case), formerly consisted of all kinds of old iron, nails, musket-balls, stones, &c. used as above.

SHOT OF A CABLE, on ship-board, is the splicing of two cables together, that a ship may ride safe in deep waters and in great roads; for a ship will ride easier by one shot of a cable, than by three short cables out ahead.

SHOT (Grape). See GRAPE-SHOT.

SHOT (Patent milled), is thus made; sheets of lead, whose thickness corresponds with the size of the shot required, are cut into small pieces, or cubes, of the form of a die. A great quantity of these little cubes are put into a large hollow iron cylinder, which is mounted horizontally and turned by a winch; when by their friction against one another, and against the sides of the cylinder, they are rendered perfectly round and very smooth. The other patent-shot is cast in moulds, in the same way as bullets are.

SHOT (Common small), or that used for fowling, should be well sized; for, should it be too great, then it flies thin and scatters too much; or if too small, then it has not weight and strength to penetrate far, and the bird is apt to fly away with it. In order, therefore, to have it suitable to the occasion, it not being always to be had in every place fit for the purpose, we shall set down the true method of making all sorts and sizes under the name of mould-shot, formerly made after the following process:

Take any quantity of lead you think fit, and melt it down in an iron vessel; and as it melts keep it stirring with an iron ladle, skimming off all impurities whatsoever that may arise at top; when it begins to look of a greenish colour, strew on it as much auri-pigmentum or yellow orpiment, finely powdered, as will lie on a shilling, to every twelve or fourteen pounds of lead; then stirring them together, the orpiment will flame. The ladle should have a notch on one side of the brim, for more easily pouring out the lead; the ladle must remain in the melted lead, that its heat may be the same with that of the lead, to prevent inconveniences which otherwise might happen by its being either too hot or too cold; then, to try your lead, drop a little of it into water, and if the drops prove round, then the lead is of a proper heat; if otherwise, and the shot have tails, then add more orpiment to increase the heat, till it is found sufficient.

Then take a plate of copper, about the size of a trencher, which must be made with a hollowness in the middle, about three inches compass, within which must be bored about 40 holes according to the size of the shot which you intend to cast; the hollow bottom should

be thin; but the thicker the brim, the better it will retain the heat. Place this plate on a frame of iron, over a tube or vessel of water, about four inches from the water, and spread burning coals on the plate, to keep the lead melted upon it; then take some lead and pour it gently on the coals on the plate, and it will make its way through the holes into the water, and form itself into shot; do thus till all your lead is run through the holes of the plate, taking care, by keeping your coals alive, that the lead does not cool, and so stop up the holes.

While you are casting in this manner, another person with another ladle may catch some of the shot, placing the ladle four or five inches underneath the plate in the water, by which means you will see if they are defective, and rectify them. Your chief care is to keep the lead in a just degree of heat, that it shall be not so cold as to stop up the holes in your plate, nor so hot as to cause the shot to crack; to remedy the heat, you must refrain working till it is of a proper coolness; and to remedy the coolness of your lead and plate, you must blow your fire; observing, that the cooler your lead is, the larger will be your shot; as, the hotter it is, the smaller they will be.

After you have done casting, take them out of the water, and dry them over the fire with a gentle heat, stirring them continually that they do not melt; when dry, you are to separate the great shot from the small, by the help of a sieve made for that purpose, according to their several sizes. But those who would have very large shot, make the lead trickle with a stick out of the ladle into the water, without the plate. If it stops on the plate, and yet the plate is not too cool, give but the plate a little knock, and it will run again: care must be had that none of your implements are greasy, oily, or the like; and when the shot, being separated, are found too large or too small for your purpose, or otherwise imperfect, they will serve again at the next operation.

SHOT (Tin-case), in artillery, is formed by putting a great quantity of small iron shot into a tin cylindrical box called a cannister, that just fits the bore of the gun. Leaden bullets are sometimes used in the same manner; and it must be observed, that whatever number or sizes of the shots are used, they must weigh with their cases nearly as much as the shot of the piece.

SHOT (Weight of). The weight and dimensions of balls may be found, the one from the other, whether they are of iron or of lead. Thus,

The weight of an iron ball of 4 inches diameter, is 9lb. and because the weight is as the cube of the diameter, therefore as $4^3 : 9 :: d^3 : \frac{9}{64} d^3 = w$, the weight of the iron ball whose diameter is d; that is, $\frac{9}{64}$ of the cube of its diameter. And, conversely, if the weight be given, to find the diameter, it will be $\sqrt[3]{\frac{64}{9} w} = d$; that is, take $\frac{64}{9}$ or $7\frac{1}{9}$ of the weight, and the cube root of that will be the diameter of the iron ball.

For leaden balls; one of $4\frac{1}{4}$ inches diameter weighs 17 pounds; therefore as the cube of $4\frac{1}{4}$ is to 17, or nearly as $9 : 2 :: d^3 : \frac{2}{9} d^3 = w$, the weight of the leaden ball whose diameter is d, that is, $\frac{2}{9}$ of the cube of the diameter. On the contrary, if the weight be given, to find the diameter, it will be $\sqrt[3]{\frac{9}{2} w} = d$; that is, $\frac{9}{2}$ or $4\frac{1}{2}$ of the weight, and the cube root of the product.

SHOT (Indian), in botany. See CANNA.

SHO'TFREE. *a.* (*shot* and *free*.) 1. Clear of the reckoning (*Shakspeare*). 2. Not to be hurt by shot. 3. Unpunished.

SHO'TTEN. *a.* (from *shoot*.) Having ejected the spawn (*Shakspeare*).

To SHOVE. *v. a.* (ꝛcufan, Saxon.) 1. To push by main strength (*Shakspeare*). 2. To drive a boat by a pole that reaches to the bottom of the water. 3. To push; to rush against (*Arbuthnot*).

To SHOVE. *v. n.* 1. To push forward before one (*Swift*). 2. To move in a boat, not by oars but a pole (*Garth*).

SHOVE. *s.* (from the verb.) The act of shoving; a push (*Swift*).

SHO'VEL. *s.* (ꝛcoꝛl, Sax. *scheoffel*, Dut.) An instrument consisting of a long handle and broad blade with raised edges (*Glanville*).

To SHO'VEL. *v. a.* (from the noun.) 1. To throw or heap with a shovel (*Shakspeare*). 2. To gather in great quantities (*Derham*).

SHOVEL (Sir Cloudesly), a gallant English admiral, was born in 1650, of mean parentage. He went early to sea, and from being a cabin boy, rose to the first honours of his profession. In 1674 he served in the Mediterranean, under sir John Narborough, and did such service by burning the ships in the harbour of Tripoly, that sir John recommended him in his letters, and Shovel obtained the command of a ship. He rendered great services to king William at Bantry bay, for which he was knighted; and in 1690 had the honour of receiving an admiral's commission from the king's own hand. He had a considerable share in the great victory at La Hogue; as he had also in that off Malaga, where sir George Rooke commanded in 1704. The year following he had the command of the fleet in the Mediterranean, and by his activity Barcelona was taken. Shortly after this he proceeded for England, but in the night of October 22d, his ship and several others struck on the rocks of Scilly, and were lost. His body was cast on shore the next day, and was brought to Portsmouth, from whence it was removed to London, and buried in Westminster-abbey, where a monument was erected to his memory.

SHO'VELBOARD. *s.* (*shovel* and *board*.) A long board on which they play by sliding metal pieces at a mark (*Dryden*).

SHOVELLER, in ornithology. See ANAS.

SHOUGH. *s.* (for *shock*.) A species of shaggy dog; a shock (*Shakspeare*).

SHOULD. (*scude*, Dut. ꝛceolꝺan, Sax.) This is a kind of auxiliary verb used in the conjunctive mood, of which the signification is not easily fixed.

SHO'ULDER. *s.* (ꝛculꝺꝛ, Sax.) 1. The

joint which connects the arm to the body (*Shakspeare*). 2. The upper joint of the fore leg of edible animals (*Addison*). 3. The upper part of the back (*Dryden*). 4. The shoulders are used as emblems of strength, or the act of supporting (*Shakspeare*). 5. A rising part; a prominence (*Moxon*).

To SHO'ULDER. *v. a.* (from the noun.) 1. To push with insolence and violence (*Spenser*). 2. To put upon the shoulder (*Glanville*).

SHO'ULDERBELT. *s.* (*shoulder* and *belt.*) A belt that comes across the shoulder (*Dryden*).

SHO'ULDERBLADE. *s.* The scapula; the plate bone to which the arm is connected. See ANATOMY.

SHO'ULDERCLAPPER. *s.* (*shoulder* and *clap.*) One who affects familiarity, or one that mischiefs privily (*Shakspeare*).

SHO'ULDERSHOTTEN. *a.* (*shoulder* and *shot.*) Strained in the shoulder (*Shakspeare*).

SHOULDER-PEGGED HORSES. Horses that are gourdy, stiff, and almost incapable of motion.

SHO'ULDERSLIP. *s.* (*shoulder* and *slip.*) Dislocation of the shoulder (*Swift*).

To SHOUT. *v. n.* To cry in triumph or exultation (*Waller*).

SHOUT. *s.* A loud and vehement cry of triumph or exultation (*Dryden*).

SHO'UTER. *s.* He who shouts (*Dryden*).

To SHOW. *v. a.* pret. *showed* and *shown*; part. pass. *shown.* (sceapan, Sax. *showen*, Dut. It is frequently written *shew*, but is always pronounced *show.*) 1. To exhibit to view (*L'Estrange*). 2. To afford to the eye or notice (*Milton*). 3. To make to see (*Milton*). 4. To make to perceive (*Milton*). 5. To make to know (*Milton*). 6. To give proof of; to prove (*Dryden*). 7. To publish; to make public (*Peter*). 8. To inform; to teach (*Job*). 9. To make known (*Milton*). 10. To point the way; to conduct (*Swift*). 11. To offer; to afford (*Deut.*). 12. To explain; to expound (*Daniel*). 13. To discover; to point out (*Milton*).

To SHOW. *v. n.* 1. To appear; to look (*Dryden*). 2. To have appearance; to seem (*Shakspeare*).

SHOW. *s.* (from the verb.) 1. A spectacle; something publicly exposed to view for money (*Addison*). 2. Superficial appearance (*Milton*). 3. Ostentatious display (*Granville*). 4. Object attracting notice (*Addison*). 5. Public appearance (*Milton*). 6. Semblance; likeness (*Milton*). 7. Speciousness; plausibility (*Whitgift*). 8. External appearance (*Sidney*). 9. Exhibition to view (*Shakspeare*). 10. Pomp; magnificent spectacle (*Bacon*). 11. Phantom; not reality (*Dryden*). 12. Representative action (*Addison*).

SHO'WBREAD, or SHEWBREAD. *s.* (*show* and *bread.*) Among the Jews, loaves of bread that the priest of the week put every Sabbath-day upon the golden table before the Lord. They were covered with leaves of gold, and were twelve in number, representing the twelve tribes of Israel. They served them up hot, and took away the stale ones, which could not be eaten but by the priest alone. This offering was accompanied with frankincense and salt.

SHO'WER. *s.* (*scheure*, Dutch.) 1. Rain either moderate or violent (*Bacon*). 2. Storm of any thing falling thick (*Pope*). 3. Any very liberal distribution (*Shakspeare*).

To SHO'WER. *v. a.* (from the noun.) 1. To wet or drown with rain (*Milton*). 2. To pour down (*Milton*). 3. To distribute or scatter with great liberality (*Wotton*).

To SHO'WER. *v. n.* To be rainy.

SHO'WERY. *a.* (from *shower.*) Rainy (*Bacon*).

SHO'WISH. *a.* (from *show.*) 1. Splendid; gaudy (*Swift*). 2. Ostentatious.

SHOWN. (pret. and part. pass. of *To show.*) Exhibited (*Milton*).

SHO'WY. *a.* (from *show.*) Ostentatious (*Addison*).

SHRANK. The preterit of *shrink.*

To SHRED. *v. a.* pret. *shred.* (screadan, Saxon.) To cut into small pieces (*Hooker*).

SHRED. *s.* (from the verb.) 1. A small piece cut off (*Bacon*). 2. A fragment (*Swift*).

SHREW. *s.* (*schreyen*, Germ. to clamour.) A peevish, malignant, clamorous, spiteful, vexatious, turbulent woman (*Shakspeare*).

SHREWD. *a.* (contracted from *shrewed.*) 1. Having the qualities of a shrew; malicious; troublesome; mischievous (*Shakspeare*). 2. Maliciously sly; cunning (*Tillotson*). 3. Bad; ill-betokening (*South*). 4. Painful; pinching; dangerous; mischievous (*South*).

SHRE'WDLY. *ad.* (from *shrewd.*) 1. Mischievously; destructively (*Wotton*). 2. Vexatiously (*South*). 3. With good guess (*Locke*).

SHRE'WDNESS. *s.* (from *shrewd.*) 1. Sly cunning; archness (*Swift*). 2. Mischievousness; petulance.

SHRE'WISH. *a.* (from *shrew.*) Having the qualities of a shrew; froward; petulantly clamorous (*Shakspeare*).

SHRE'WISHLY. *ad.* Petulantly; peevishly; clamorously; frowardly (*Shakspeare*).

SHRE'WISHNESS. *s.* (from *shrewish.*) The qualities of a shrew; frowardness; petulance; clamorousness (*Shakspeare*).

SHRE'WMOUSE. *s.* (sceapa, Sax.) A mouse of which the bite is falsely supposed venemous, its teeth being equally harmless with those of any other mouse. See SOREX.

SHREWSBURY, a borough in Shropshire, and the capital of that county, with a market on Wednesday, Thursday, and Saturday. It is seated on a peninsula formed by the Severn, over which are two bridges, and is surrounded by a wall, with three gates. Here was formerly a castle and abbey, both now in ruins. It contains five churches, is governed by a mayor, and sends two members to parliament. It is the chief mart for a coarse kind of woollen cloth, made in Montgomeryshire, called Welsh webs, and for all sorts of Welsh commodities, which are generally bought in a rough state at Welshpool, and finished here. It is also famous for its excellent brawn. In 1283, Ed-

ward I. held a parliament here, when the lords sat in the castle, and the commons in a barn. Another parliament was held here in 1397, by Richard II. In 1801 the inhabitants of Shrewsbury were 14,739; since then they have rather increased. Near this town, in 1403, was fought the battle between Henry IV. and Henry Percy, nicknamed Hotspur, in which the latter was defeated and slain. Shrewsbury is 18 miles E. of Welshpool, 36 W. of Lichfield, and 160 N.W. of London. Lon. 2. 41 W. Lat. 52. 43 N.

SHREWSBURY, a town of the United States, in New Jersey, and county of Monmouth, 35 miles S.W. of New York.

To SHRIEK. *v. n.* (*skrieger*, Danish.) To cry out inarticulately with anguish or horror; to scream (*Dryden*).

SHRIEK. *s.* (*skrieg*, Danish.) An inarticulate cry of anguish or horrour (*Dryden*).

SHRIFT. *s.* (ꝛcꝛiꝼt, Saxon.) Confession made to a priest: out of use (*Rowe*).

SHRIGHT, for *shrieked* (*Spenser*).

SHRIKE, in ornithology. See LANIUS.

SHRILL. *a.* Sounding with a piercing, tremulous, or vibratory sound (*Shakspeare*).

To SHRILL. *v. n.* (from the adjective.) To pierce the ear with sharp and quick vibrations of sound (*Fenton*).

SHRI'LLY. *ad.* (from *shrill.*) With a shrill noise.

SHRI'LLNESS. *s.* (from *shrill.*) The quality of being shrill.

SHRIMP. *s.* (*schrumpe*, a wrinkle, Germ.) 1. A small crustaceous fish. (See CANCER.) 2. A little wrinkled man; a dwarf (*Shaksp.*).

SHRINE. *s.* (ꝛcꝛin, Saxon; *scrinium*, Latin.) A case in which something sacred is reposited (*Watts*).

To SHRINK. *v. n.* pret. *I shrunk* or *shrank*; participle *shrunken*. ꝛcꝛincan, Saxon.) 1. To contract itself into less room; to shrivel; to be drawn together by some internal power (*Bacon*). 2. To withdraw as from danger (*Dryden*). 3. To express fear, horrour, or pain, by shrugging or contracting the body (*Shakspeare*). 4. To fall back as from danger (*South*).

To SHRINK. *v. a.* part. pass. *shrunk*, *shrank*, or *shrunked*. To make to shrink (*Shakspeare*).

SHRINK. *s.* (from the verb.) 1. Corrugation; contraction into less compass (*Woodw.*). 2. Contraction of the body from fear or horrour (*Daniel*).

SHRI'NKER. *s.* (from *shrink.*) He who shrinks.

To SHRIVE. *v. a.* (ꝛcꝛiꝼan, Saxon.) To hear at confession: not in use (*Cleaveland*).

To SHRI'VEL. *v. n.* (*schrompelen*, Dutch.) To contract itself into wrinkles (*Arbuthnot*).

To SHRI'VEL. *v. n.* To contract into wrinkles (*Dryden*).

SHRIVELLING, or WITHERING, in botany. Marcescens. Decaying without falling off: as the corol of plantain.

SHROPSHIRE, or SALOP, a county of England, 50 miles long and 40 broad; bounded on the N. by Cheshire and a detached part of Flintshire, on the E. by Staffordshire, on the S.E. by Worcestershire, on the S. by Herefordshire, on the S.W. by Radnorshire, and on the W. by the counties of Montgomery and Denbigh. It lies partly in the diocese of Lichfield and Coventry, and partly in that of Hereford; contains 14 hundreds, 16 market-towns, and 170 parishes; and sends 12 members to parliament. In 1801 the inhabitants amounted to 167,639, in 1811 to 194,700. (See POPULATION.)—The air is salubrious, and not very sharp, except on the hills. The soil is generally fruitful, especially in the N. and E. parts, which produce plenty of wheat and barley; but the S. and W. being mountainous, are less fertile, yet yield sufficient pasture for sheep and cattle. This county abounds with lead, copper, iron, limestone, freestone, pipe-clay, bitumen, and coal. The principal rivers are the Severn and the Tend. The capital is Shrewsbury.

SHROUD. *s.* (ꝛcꝛuꝺ, Saxon.) 1. A shelter; a cover (*Milton*). 2. The dress of the dead; a windingsheet (*Shakspeare*). 3. The sail ropes (*Pope*).

To SHROUD. *v. a.* (from the noun.) 1. To shelter; to cover from danger as an agent (*Knolles*). 2. To shelter as the thing covering (*Raleigh*). 3. To dress for the grave (*Donne*). 4. To clothe; to dress. 5. To cover or conceal (*Addison*). 6. To defend; to protect (*Waller*).

To SHROUD. *v. n.* To harbour; to take shelter (*Milton*).

SHROVE-TIDE. The time of confession.

SHROVE-TUESDAY, is the Tuesday after Quinquagesima Sunday, or the day immediately preceding the first of Lent; being so called from the Saxon word *shrive*, which signifies to confess. Hence Shrove-Tuesday signifies Confession-Tuesday, on which day all the people in every parish throughout England (during the Romish times) were obliged to confess their sins, one by one, to their own parish priests, in their own parish churches; and, that this might be done the more regularly, the great bell in every parish was rung at 10 o'clock, or perhaps sooner, that it might be heard by all, and that they might attend, according to the custom then in use; and though the Romish religion has now given way to the Protestant religion, the custom of ringing the great bell in our ancient parish churches, at least in some of them, still remains, and obtains in and about London the name of pancake bell; perhaps, because after the confession it was customary for the several persons to dine on pancakes or fritters. Many churches, indeed, have rejected that custom of ringing the bell on Shrove-Tuesday; but the usage of dining on pancakes or fritters, and such like provision, still continues.

SHRUB. Frutex. In its general acceptation, is a vegetable with several permanent woody stems, dividing from the bottom, more slender and lower than in trees. Linnæus makes the distinction of a shrub from a tree to consist in its having no buds: but trees have

not buds in hot climates. He acknowledges, indeed, that nature has placed no limits between them.

SHRUB, a compound liquor, made of ardent spirits, orange-juice, and sugar.

Though we do not profess to be acquainted with the exact proportion of the ingredients employed by shrub-drinkers, yet it appears that one pint of the best coniac brandy requires to be diluted with the expressed and filtered juice of four or six China oranges, and half a pound of refined sugar. Thus, a very palatable, but seductive liquor is produced; the effects of which, if frequently resorted to, cannot fail of undermining the constitution of its votaries. Having in various articles explained the injurious consequences to be apprehended from the liberal use of arrack, brandy, gin, and rum, we shall at present only remark, that shrub is incomparably more tempting and insinuating, especially to weak females, than any of the simple spirits; because, in combination with sweet ingredients, this liquor imperceptibly stimulates, and gradually impairs the digestive organs, while it deprives such persons of that share of tottering health which they vainly hoped to support.

SHRU'BBY. *a.* (from *shrub.*) 1. Resembling a shrub (*Mortimer*). 2. Full of shrubs; bushy (*Milton*).

SHRUFF. *s.* Dross; the refuse of metal tried by the fire.

To SHRUG. *v. n.* (*schricken*, Dutch, to tremble.) To express horrour or dissatisfaction by motion of the shoulders, or whole body (*Swift*).

To SHRUG. *v. a.* To contract or draw up (*Hudibras*).

SHRUG. *s.* (from the verb.) A motion of the shoulders usually expressing dislike or aversion (*Cleaveland*).

SHRUNK. The pret. and part. passive of *shrink.*

SHRU'NKEN. The part. passive of *shrink.*

SHUCKFORD (Samuel), a learned English divine, who was rector of Shelton, in Norfolk, canon of Canterbury, and chaplain to the king. He wrote a History of the World, Sacred and Profane, by way of introduction to dean Prideaux's connection, and died in 1754. He wrote also a Treatise on the Creation and Fall of Man, to serve as a supplement to the preface to his history.

To SHU'DDER. *v. a.* (*schuddren*, Dutch.) To quake with fear, or with aversion (*Dryden*).

To SHU'FFLE. *v. a.* (ꝑypelinȝ, Saxon; a bustle, a tumult.) 1. To throw into disorder; to agitate tumultuously, so as that one thing takes the place of another (*Blackmore*). 2. To change the position of cards with respect to each other (*Bacon*). 3. To remove, or introduce, with some artificial or fraudulent tumult (*Dryden*). 4. *To* SHUFFLE *off.* To get rid of (*Locke*). 5. *To* SHUFFLE *up.* To form tumultuously or fraudulently (*Howel*).

To SHUFFLE. *v. n.* 1. To throw the cards into a new order (*Granville*). 2. To play mean tricks; to practise frauds; to evade fair questions (*South*). 3. To struggle; to shift (*Shakspeare*). 4. To move with an irregular gait (*Shakspeare*).

SHU'FFLE. *s.* (from the verb.) 1. The act of disordering things, or making them take confusedly the place of each other (*Bentley*). 2. A trick; an artifice (*L'Estrange*).

SHU'FFLECAP. *s.* (*shuffle* and *cap.*) A play at which money is shaken in a hat (*Arbuthnot*).

SHU'FFLER. *s.* (from *shuffle.*) He who plays tricks or shuffles.

SHU'FFLINGLY. *ad.* (from *shuffle.*) With an irregular gait (*Dryden*).

To SHUN. *v. a.* (ꝑcunian, Saxon.) To avoid; to decline; to endeavour to escape; to eschew (*Waller*).

SHU'NLESS. *a.* (from *shun.*) Inevitable; unavoidable (*Shakspeare*).

To SHUT. *v. a.* preterit *I shut*; part. pass. *shut.* (ꝑcittan, Saxon; *schutten*, Dutch.) 1. To close so as to prohibit ingress or regress; to make not open (*Milton*). 2. To enclose; to confine (*Galatians*). 3. To prohibit; to bar (*Milton*). 4. To exclude (*Dryden*). 5. To contract; not to keep expanded (*Deuteron.*). 6. *To* SHUT *out.* To exclude; to deny admission to (*Locke*). 7. *To* SHUT *up.* To close; to make impervious; to make impassable (*Raleigh*). 8. *To* SHUT *up.* To confine; to enclose; to imprison (*Arbuthnot*). 9. *To* SHUT *up.* To conclude (*Knolles*). *To* SHUT. *v. n.* To be closed; to close itself: as, *flowers open in the day, and* shut *at night.*

SHUT. *part. adj.* Rid; clear; free (*L'Estr.*).

SHUT. *s.* (from the verb.) 1. Close; act of shutting (*Dryden*). 2. Small door or cover (*Wilkins*).

SHU'TTER. *s.* (from *shut.*) 1. One that shuts. 2. A cover; a door (*Dryden*).

SHUTTLE, in the manufactures, an instrument much used by weavers, in the middle of which is an eye or cavity, wherein is inclosed the spoul with the woof. See WEAVING.

SHU'TTLECOCK. *s.* (See SHITTLECOCK.) A cork stuck with feathers, and beaten backward and forward (*Spenser*).

SHY. *a.* (*schowe*, Dutch; *schifo*, Italian.) 1. Reserved; not familiar; not free of behaviour (*Arbuthnot*). 2. Cautious; wary; chary (*Hudibras*). 3. Keeping at a distance; unwilling to approach (*Norris*). 4. Suspicious; jealous; unwilling to suffer near acquaintance.

SI, in music, a seventh note or sound, added by Le Maire to the six ancient notes invented by Guido Aretine, viz. ut, re, mi, fa, sol, la, si.

SIALAGOGUES. (*medicamenta sialagoga*; from σιαλαγωγα, saliva, and αγω, to expel.) Those medicines are so called, which excite an uncommon flow of saliva: such are mercurial preparations, pyrethrum, &c. They are divided into *sialagoga topica*, as scilla, nicotiana, piper, &c. and *sialagoga interna*, as the various preparations of mercury.

SIAM, a kingdom of Asia, bounded on the N. by China, on the E. by Laos and Cambo-

dia, on the S. by the gulf of Siam, and on the W. by the bay of Bengal and Pegu. It is 550 miles in length, and 250 in breadth, though in some places not above 50; and is divided into the Higher and Lower. It is a flat country, and in the rainy season is overflowed; for which reason most of the houses are built on pillars, and have no communication for some months but by boats. There are mines of gold, silver, tin, and copper, and plenty of pepper, rice, cotton, aloes, benjamin, and musk. The tame cattle are beeves, buffaloes, and hogs; the woods abound with elephants, rhinoceroses, leopards, and tigers; beside which there are large crocodiles, and serpents 20 feet long. The inhabitants, both men and women, go almost naked; except the better sort who wear rich garments. They are well shaped, have large foreheads, little noses, handsome mouths, plump lips, and black sparkling eyes. The men are of an olive colour, with little beards; but the women are of a straw complexion, and some have their cheeks a little red. The king shows himself but once a year to the common people. He is proprietor of all the lands in the country, and keeps a numerous army, among which are 1000 elephants. Their temples and priests are very numerous: the latter are distinguished from the laity by an orange-coloured garment, and they keep their heads, beards, and eyebrows, close shaved. They have schools for the education of their children, and there is scarcely any among them but can read and write.

SIAM, or JUTHIA, a city, capital of a kingdom of the same name. It contains a great number of temples, convents, chapels, columns, and other decorations. The king's palace, and some others, only exceed the common habitations by occupying a more extensive space, being better constructed, and of a greater height, but never exceed one floor. The Dutch have a factory here, and merchants from different countries come here to trade. In 1766, this city was taken by the Birmans. It is situate on an island in the river Menan, 50 miles N. of its mouth in the gulf of Siam, and 360 S.E. of Pegu. Lon. 100. 50 E. Lat. 14. 18 N.

SIARA, a province of Brazil, which lies between those of Maragnan and Petaguel. The capital, of the same name, has a fort, on a mountain, near the mouth of the river Siara. Lon. 39. 35 W. Lat. 3. 30 S.

SIASKOI, a town of Russia, in the government of Petersburg, near the lake Ladoga, 24 miles N.E. of New Ladoga. Lon. 30. 47 E. Lat. 60. 16 N.

SIBBALD (Sir Robert), a learned Scotchman, was born in Fifeshire, in 1643, and educated at the university of St. Andrew, where he took his degrees, and then travelled into France and Italy. On his return to Scotland, he projected the plan for establishing a Royal College of Physicians. He likewise planted the botanical garden, which has been since his time much improved. His practice in physic was very extensive, but he employed much of his time in the study of the antiquities of Scotland. He died in 1750. He wrote the Natural History of Scotland, and the History of Fifeshire.

SIBBALDIA, in botany, a genus of the class pentandria, order pentagynia. Calyx ten-cleft; petals five, inserted on the calyx; styles from the side of the germ; seeds five, in the bottom of the calyx. Three species; two, natives of Siberia, erect, with purple flowers; one, sibbaldia procumbens, common to our own mountains, procumbent, with three-toothed, wedge-form leaflets.

SIBERIA, a country of Asia, comprehending the principal Asiatic part of the Russian empire. It is bounded on the E. by the Pacific ocean, S. by Great Tartary, W. by European Russia, and N. by the Frozen ocean. It extends 3500 miles from E. to W. and 1200 from N. to S. containing the half of Asia. The S. part is fertile, producing all the necessaries of life; but the N. and E. parts are extremely cold, and thin of people, presenting vast marshy plains, covered with almost perpetual snow, and pervaded by enormous rivers, which, under masses of ice, pursue their course to the Arctic ocean: there are also extensive plains called stepps, which are somewhat similar to the sandy deserts of Africa. There are inexhaustible forests of birch, alder, lime, &c. and millions of noble trees of the pine kind: the Siberian plum and crab, the mountain ash, Tartarian mulberry and honeysuckle, and Daourian rose, form thickets of exquisite beauty; under shelter of which arise a multitude of plants, particularly the yellow sarine lily and the sibiricum; the roots of the former are a favourite food with the Tartarian tribes, and from the dried stalks of the other the natives procure a saccharine efflorescence, from which they make a coarse ardent spirit. The principal riches of Siberia consists in fine skins and furs, and mines of gold, silver, iron, lead, and copper. Several kinds of precious stones are found here, particularly topazes of a very fine lustre; it also affords magnets of an extraordinary size, and even whole mountains of loadstone. Coal is dug up in the N. parts, and a yellowish kind of alum is found in several mountains. The inhabitants are of three sorts; the natives of the country, Tartars, and Russians. The former dwell in forests in the winter, and in the summer on the banks of rivers. Their garments are the skins of wild beasts, and their riches consist in bows, arrows, a knife, and a kettle. They all live in wretched huts, which they remove from place to place; and make use of raindeer and dogs to draw their sledges. Those in the southern parts are not much more polite; but they have horses with which they hunt, and their houses, though poor hovels, are not shifted from place to place. Of this class of people, some have no other religion than that of nature; others are pagans and Mahometans; and some of them have been converted to Christianity by the Russian missionaries. The Tartars who live in this country are the most civilized of

any foreign nation in Siberia; and those Tartars who are Mahometans are still more so than the pagan Tartars, of whom there are many different hordes or tribes. The Russians settled here are much the same as in their native country. Siberia is the place to which criminals, as well as persons under the displeasure of the court, are commonly banished from Russia. Through this vast tract the Russian caravans travel every year, with their merchandise, to China. The principal rivers are the Oby, Lena, Irtysh, and Yenisei; and there are numerous lakes of fresh water, and some of a saline nature. Siberia was reduced under the dominion of Russia about the close of the 16th century: the W. part of it is comprised in the governments of Tobolsk, Ufa, and Kolyvan; the E. part in the government of Irkutsh.

SIBERIAN CRAB, in botany. See PYRUS.

SI'BILANT. *a.* (*sibilans*, Latin.) Hissing (*Holder*).

SIBILA'TION. *a.* (from *sibilo*, Latin.) A hissing sound (*Bacon*).

SIBTHORPE (John), professor of botany at Oxford, and F. R. S.; was the son of Dr. Humphrey Sibthorpe, whom he succeeded in his professorship. He went twice into the Levant to collect rare plants, and his collection was uncommonly large and curious, which he bequeathed to the University. He published a Flora Oxoniensis, and died in 1796.

SIBTHORPIA, in botany, a genus of the class didynamia, order angiospermia. Calyx five-parted; corol five-parted, irregular; stamens approaching each other in pairs; capsule compressed, inversely heart-shaped, two-celled, with transverse partitions. One species only, sibthorpia Europæa, with prostrate, filiform, hairy stems; kidney-form leaves; and axillary, solitary flowers; a native of the wet shades of our own country: in flower from July to September.

SIBYLS, in pagan antiquity, certain women said to have been endowed with a prophetic spirit, and to have delivered oracles, shewing the fates and revolutions of kingdoms. Their number is unknown. Plato speaks of one, others of two, Pliny of three, Ælian of four, and Varro of ten; an opinion which is universally adopted by the learned. These ten Sibyls generally resided in the following places: Persia, Libya, Delphi, Cumæ in Italy, Erythræa, Samos, Cumæ in Æolia, Marpessa on the Hellespont, Ancyra in Phrygia, and Tiburtis. The most celebrated of the Sibyls is that of Cumæ in Italy, whom some have called by the different names of Amalthæa, Demiphile, Herophile, Daphne, Manto, Phemonoe, and Deiphobe. It is said that Apollo became enamoured of her, and that, to make her sensible of his passion, he offered to give her whatever she should ask. The Sibyl demanded to live as many years as she had grains of sand in her hand; but unfortunately forgot to ask for the enjoyment of the health, vigour, and bloom, of which she was then in possession. The god granted her request; but she refused to gratify the passion of her lover, though he offered her perpetual youth and beauty. Some time after she became old and decrepit, her form decayed, melancholy, paleness, and haggard looks, succeeded to bloom and cheerfulness. She had already lived about 700 years when Æneas came to Italy, and, as some have imagined, she had three centuries more to live before her years were as numerous as the grains of sand which she had in her hand. She gave Æneas instructions how to find his father in the infernal regions, and even conducted him to the entrance of hell. It was usual in the Sibyl to write her prophecies on leaves placed at the entrance of her cave, and it required particular care in such as consulted her to take up these leaves before they were dispersed by the wind, as their meaning then became incomprehensible. According to the most authentic historians of the Roman republic, one of the Sybils came to the palace of Tarquin the Second, with nine volumes, which she offered to sell for a very high price. The monarch disregarded her, and she immediately disappeared, and soon after returned, when she had burned three of the volumes. She asked the same price for the remaining six books; and when Tarquin refused to buy them, she burned three more, and still persisted in demanding the same sum of money for the three that were left. This extraordinary behaviour astonished Tarquin; he bought the books, and the Sibyl instantly vanished, and never after appeared to the world. These books were preserved with great care by the monarch, and called the Sibylline verses. A college of priests was appointed to have the care of them. The word Sibyl seems to be derived from σιευ, Æolice for Διος Jovis, and βουλη consilium.

SICAMBRI or SYGAMBRI, a people of Germany conquered by the Romans. They revolted under Augustus, who marched against them, but did not totally reduce them. Drusus conquered them, and they were carried away from their native country to inhabit some of the more westerly provinces of Gaul.

SICANI, a people of Spain, who left their native country and passed into Italy, and afterwards into Sicily, which they called Sicania. They inhabited the neighbourhood of mount Ætna, where they built some cities and villages (*Ovid*, *Virgil*, *Diod.*)

SICANIA, an ancient name of Italy, received from the Sicani, or from Sicanus, their king, or from Sicanus, a river in Spain, in the territory where they lived. The name is also given to Sicily. See SICANI.

SICARII, or POIGNARDERS, so called from the weapons they carried: a kind of assassins often employed, according to Josephus, by the Jewish high priests, to lie in ambush and murder innocent unarmed persons in their passage from one place to another. They were probably some of these who were hired to lie in wait for Paul, as mentioned in Acts xxv. 3.

To SI'CCATE. *v. a.* (*sicco*, Latin.) To dry.

SICCA'TION. *s.* (from *siccate*.) The act of drying.

SICCI'FIC. *a.* (*siccus* and *fico*, Latin.) Causing dryness.

SI'CCITY. *s.* (*siccité*, French; *siccitas*, Latin.) Dryness; aridity; want of moisture (*Wiseman*).

SICE. *s.* (*six*, French.) The number six at dice (*Dryden*).

SICE. *ad.* Such. See SUCH (*Spenser*).

SICILIAN, in music, denotes a kind of gay sprightly air, or dance, probably invented in Sicily, somewhat of the nature of an English jig; usually marked with the characters $\frac{6}{8}$, or $\frac{12}{8}$. It consists of two strains; the first of four, and the second of eight, bars or measures.

SICILY, an island of the Mediteranean Sea, almost in the form of a triangle, terminating in three points or capes: that which is nearest Italy is called Capo del Faro; that which regards the Morea, Capo Passero; and the third, which points to Africa, Capo di Boco. Sicily is separated from the kingdom of Naples by a narrow strait called the Faro; but as Messina is seated on it, it is called the Faro di Messina. The two kingdoms of Naples and Sicily are under the same climate, and the productions are much the same; but Sicily abounds much more in corn, particularly in the valleys of Noto and Mazara. The valley of Demona has more forests and fruit trees than the two others. Sicily is 165 miles long and 112 broad, and divided into the valleys just mentioned, called Val di Demona, Val di Noto, and Val di Mazara. In this island the ancient practice of treading out corn from the ear is in use: and here is the celebrated volcano, called Mount Etna. The government of Sicily has recently undergone various changes. According to the latest accounts the Sicilians proposed adopting a constitution like that of England; and the probability is, that ere long the island will become a province of Britain.

SICK. *a.* (ꝛeoc, Saxon; *sieck*, Dutch.) 1. Afflicted with disease (*Cleaveland*). 2. Disordered in the organs of digestion; ill in the stomach. 3. Corrupted (*Shakspeare*). 4. Disgusted (*Pope*).

To SICK. *v. n.* (from the noun.) To sicken; to take a disease: not in use (*Shakspeare*).

To SI'CKEN. *v. a.* (from *sick*.) 1. To make sick; to disease (*Prior*). 2. To weaken; to impair (*Shakspeare*).

To SI'CKEN. *v. n.* 1. To grow sick; to fall into disease (*Bacon*). 2. To be satiated; to be filled to disgust (*Shakspeare*). 3. To be disgusted, or disordered, with abhorrence (*Dryden*). 4. To grow weak; to decay; to languish (*Pope*).

SI'CKER. *a.* (*sicer*, Welsh; *seker*, Dutch.) Sure; certain; firm: obsolete (*Spenser*).

SI'CKER. *ad.* Surely; certainly (*Spenser*).

SI'CKLE. *s.* (ꝛicol, Saxon; *sickel*, Dutch; from *secale*, or *sicula*, Latin.) The hook with which corn is cut; a reaping hook (*South*).

SI'CKLEMAN. SI'CKLER. *s.* (from *sickle*.) A reaper (*Shakspeare. Sandys*).

SICKLE-SHAPED, in botany. Falcatus. Applied to the keel of a papilionaceous flower.

SI'CKLINESS. *s.* (from *sickly*.) Disposition to sickness; habitual disease (*Graunt*).

SI'CKLY. *ad.* (from *sick*.) Not in health (*Shakspeare*).

SI'CKLY. *a.* (from *sick*.) 1. Not healthy; not sound; not well; somewhat disordered (*Dryden*). 2. Faint; weak; languid (*Prior*).

To SI'CKLY. *v. a.* (from the adjective.) To make diseased; to taint with the hue of disease: not used (*Shakspeare*).

SI'CKNESS. *s.* (from *sick*.) 1. State of being diseased (*Shakspeare*). 2. Disease; malady (*Watts*). 3. Disorder in the organs of digestion.

SICYOS, in botany, a genus of the class monœcia, order triandria. Male; calyx five-toothed; corol five-petalled; filaments three; anthers cohering. Fem.; calyx five-toothed; corol five-parted; style three-cleft; drupe prickly, one-seeded. Three species; sicyos angulata, with angular leaves, a native of South America; sicyos laciniata, with leaves cut into several segments, a native of the West Indies; and sicyos garceni, with five-parted leaves, and ciliate fruit, a native of Ceylon.

SIDA, in botany, a genus of the class monadelphia, order polyandria. Calyx single, angular; style many-parted; capsules numerous, one or three-seeded. Ninety-nine species, thus subdivided:

A. Leaves narrow, lanceolate, oblong and ovate.
B. Leaves wedge-form.
C. Leaves heart-shaped, very entire.
D. Leaves heart-shaped, toothed; peduncles one flowered.
E. Leaves hearted, toothed, peduncles many-flowered, or racemed.
F. Leaves hearted, tricuspidate, or angular at the base.
G. Leaves lobed, palmate, or compound.

The following species are propagated.

1. S. rhombifolia. Rhomb-leaved sida.
2. S. periplorifolia. Great bindweed-leaved sida.
3. S. triquetra. Triangular-stalked sida.
4. S. abutilon. Broad-leaved sida.
5. S. alba. White-flowered sida.
6. S. cordifolia. Heart-leaved sida.

These are all natives of the East or West Indies, or of the Cape, with purple, white, or sulphur-colour flowers. They may be raised by seeds; some from offsets or cuttings. They afford ornament in the stove; sida abutilon in open borders, to which it may be entrusted.

SIDE. *s.* (ꝛiꝺe, Saxon; *sijde*, Dutch.) 1. The part of animals fortified by the ribs (*Thomson*). 2. Any part of any body opposed to any other part (*Wilkins*). 3. The right or left (*Dryden*). 4. Margin; edge; verge (*Roscommon*). 5. Any thing of local respect (*Milton*). 6. Party; interest; faction; sect

(*Sprat*). 7. Any part placed in contradistinction or opposition to another (*Tillotson*). 8. It is used to note consanguinity: as, *he is cousin by his father's* side.

SIDE. *a.* (from the noun.) 1. Lateral (*Exodus*). 2. Oblique; indirect (*Hooker*).

To SIDE. *v. n.* (from the noun.) 1. To lean on one side (*Bacon*). 2. To take a party; to engage in a faction (*Swift*).

SI'DEBOARD. *s.* (*side* and *board.*) The side table on which conveniences are placed for those that eat at the other table (*Dryden*).

SI'DEBOX. *s.* (*side* and *box.*) Seat for the ladies on the side of the theatre (*Pope*).

To SI'DLE. *v. n.* (from *side.*) 1. To go with the body the narrowest way (*Swift*). 2. To lie on the side (*Swift*).

SI'DELONG. *a.* (*side* and *long.*) Lateral; oblique; not in front; not direct (*Locke*).

SI'DELONG. *ad.* 1. Laterally; obliquely; not in pursuit; not in opposition (*Dryden*). 2. On the side (*Evelyn*).

SI'DER. *s.* See CIDER.

SI'DERAL. *a.* (from *sidus*, Latin.) Starry; astral (*Milton*).

SI'DERATED. *a.* (from *sideratus*, Latin.) Blasted; planet-struck (*Brown*).

SIDERA'TION. *s.* (*sideration*, French; *sideratio*, Latin.) A sudden mortification; a blast; a sudden deprivation of sense (*Ray*).

SIDEREAL, or SIDERIAL, something relating to the stars. As sidereal year, day, &c. being those marked out by the stars.

SIDEREAL YEAR. See YEAR.

SIDEREAL DAY is the time in which any star appears to revolve from the meridian to the meridian again; which is 23 hours 56′ 4″ 6‴ of mean solar time; there being 366 sidereal days in a year, or in the time of 365 diurnal revolutions of the sun; that is, exactly, if the equinoctial points were at rest in the heavens. But the equinoctial points go backward, with respect to the stars, at the rate of 50″ of a degree in a Julian year; which causeth the stars to have an apparent progressive motion eastward 50″ in that time. And as the sun's mean motion in the ecliptic is only 11 signs 29° 45′ 40″ 15‴ in 365 days, it follows, that at the end of that time he will be 14′ 19″ 45‴ short of that point of the ecliptic from which he set out at the beginning; and the stars will be advanced 50″ of a degree with respect to that point.

Consequently, if the sun's centre be on the meridian with any star on any given day of the year, that star will be 14′ 19″ 45‴ + 50″ or 15′ 9″ 45‴ east of the sun's centre, on the 365th day afterward, when the sun's centre is on the meridian.

SIDERITIS. Iron-wort. In botany, a genus of the class didynamia, order gymnospermia. Calyx five-cleft; corol ringent; the upper-lip cloven, lower three-parted; stamens within the tube of the corol, the shorter stigma involving the other. Twenty species; thus subdivided.

A. Without bractes.

B. With very entire bractes.

C. With toothed bractes.

The following are cultivated.

1. S. Canariensis. Canary iron-wort. Stem five or six feet high; woolly leaves on petioles; flowers on thick whorled spikes, of a dirty white, appearing early in June, and sometimes again in September, a native of the Canaries and Madeira.

2. S. Cretica. Cretan iron-wort. A shrub with heart-shaped, woolly leaves. A native of Crete and Candia.

3. S. Syriaca. Sage-leaved iron-wort. Stem short, woody; the whole plant covered with a very close white cotton; a native of the Levant, flowering from June to September.

SIDEROXYLON. Iron-wood. In botany, a genus of the class pentandria, order monogynia. Corol five-cleft; nectary (in most) five-leaved; stigma simple; berry five-seeded. Nine species, chiefly natives of the Cape, or other parts of Africa; one of New Holland, two of America.

The name is derived from the closeness of the woody fibre, which renders them so solid and heavy that they sink in water. Two are cultivated.

1. S. inerme. Smooth iron-wood. Unarmed; leaves perennial, obovate; peduncles round. Rises to the height of an apple tree in Africa, but with us seldom higher than eight or ten feet; bark russet; flowers in clusters, axillary, and peduncled, small and white.

2. S. lycioides. Willow-leaved iron-wood. Spinous; leaves deciduous, alternate. A native of South America.

These may be increased by seeds procured from abroad, sown in the spring in pots filled with fresh mould and plunged into the tan-bed of the stove. They are sometimes raised from slit-layers and cuttings in the summer. The first will always require the protection of the green-house; the second is hardier, and may sometimes be exposed, in a sheltered situation, to the shrubbery borders.

SIDE-SADDLE FLOWER. See SARACENIA.

SI'DESADDLE. *s.* (*side* and *saddle.*) A women's seat on horseback.

SI'DESMAN. *s.* (*side* and *man.*) An assistant to the church-warden (*Ayliffe*).

SI'DEWAYS. SI'DEWISE. *ad.* (from *side* and *way*, or *wise.*) Laterally; on one side (*Newton*).

SIDMOUTH, a fishing-town in Devonshire, much frequented in the bathing season, and was once a considerable seaport, before its harbour was choked up. It is 12 miles S.E. of Exeter, and 158 W. by S. of London. Lon. 3. 15 W. Lat. 50. 38 N.

SIDNEY (Sir Philip), was the son of sir Henry Sidney, lord deputy of Ireland and president of Wales, by Mary, the daughter of John Dudley duke of Northumberland, and was born at Penshurst in Kent, the 29th of November, 1554. He was sent young to Christ Church college, Oxford, where he continued till he was about 17 years of age, and in June 1572, was sent to travel; and, having

visited France, Germany, Hungary, and Italy, returned to England in 1575. The earl of Leicester, his uncle, then introduced him at court, and he became one of queen Elizabeth's favourites. That princess sent him, in 1576, to the emperor Rodolphus, and to other princes of Germany, when he behaved with such prudence and address, that the Poles afterwards proposed to elect him for their king, but queen Elizabeth would not consent to it. In 1579 he addressed the queen against her marriage with the duke of Anjou; and in 1581, when that treaty was renewed, was one of the tilters at the entertainment of the French ambassador; and at the duke of Anjou's departure attended him to Antwerp. In 1582 he received the honour of knighthood from her majesty, and in 1585 was sent into Flanders to the assistance of the Dutch, when he was made governor of Flushing, one of the cautionary towns delivered to her majesty, and general of horse, in both which posts he distinguished himself by his valour and prudence; particularly at his taking Axil, and his preserving the lives and honour of the English army at the enterprize of Gravelin: but at the stand made against the Spaniards before Zutphen, on the 22d of September, 1586, after having two horses killed under him, he was greatly wounded as he was mounting the third, by a musket shot, which broke his thigh-bone. The horse he rode being extremely mettlesome, then forced him to forsake the field, though not his back, when passing along by the rest of the army where his uncle the general was, and being thirsty with excess of bleeding, he called for drink, which was presently brought him, but as he was putting the bottle to his mouth, he saw a poor wounded soldier carried along, who with a ghastly look fixed his eyes on the bottle, which sir Philip perceiving, took it from his head before he had tasted it, and delivered it to the poor man, crying, "Thy necessity is yet greater than mine," and then having drank after him, was soon after carried to Arnheim, where he languished about 25 days, and died on the 16th of October, 1586.

The states of Zealand became suitors to the crown, that they might have the honour of burying his body at the public expence of their government; but in this they were denied, for soon after his death his body was conveyed to Flushing, and being embarked with great solemnity, was landed at Tower-wharf on the 16th of November, and was interred with great pomp in St. Paul's cathedral, the 16th of February following.

It is remarkable, that in England the public were so afflicted at his loss, that for many months it was thought indecent in any gentleman to appear splendidly dressed. The University of Oxford wrote verses to his memory, printed in 1587; several writers of Cambridge, as well as others, wrote poems on his death; and, many years after, king James I. honoured him with an epitaph of his own composition. Sir Philip Sidney wrote Arcadia, a pastoral romance, and a great many other pieces.

SIDNEY (Algernon), was the second son of Robert earl of Leicester, and of Dorothy, eldest daughter of the earl of Northumberland. He was born about the year 1617. During the civil wars he took part against the king, and distinguished himself as a colonel in the army of the parliament. He was afterwards appointed one of king Charles's judges, but declined appearing in that court. During the usurpation of Cromwell, Sidney, who was a violent republican, retired to the country, and spent his time in writing those discourses on government which have been so deservedly celebrated. After the death of the Protector, he again took part in the public transactions of his country, and was abroad on an embassy to Denmark when king Charles was restored. Upon this he retired to Hamburg, and afterwards to Francfort, where he resided till 1677, when he returned to England, and obtained from the king a pardon. It has been affirmed, but the story deserves no credit, that during his residence abroad king Charles hired ruffians to assassinate him. After his return he made repeated attempts to procure a seat in parliament, but all of them proved unsuccessful. After the intention of the commons to seclude the duke of York from the throne had been defeated by the sudden dissolution of parliament, Sidney joined with eagerness the councils of Russel, Essex, and Monmouth, who had resolved to oppose the duke's succession by force of arms. Frequent meetings were held at London; while, at the same time, a set of subordinate conspirators, who were not, however, admitted into their confidence, met and embraced the most desperate resolutions. Keiling, one of these men, discovered the whole conspiracy; and Algernon Sidney, together with his noble associates, was immediately thrown into prison, and no art was left unattempted in order to involve them in the guilt of the meaner conspirators.

Howard, an abandoned nobleman, without a single spark of virtue or honour, was the only witness against Sidney; but as the law required two, his discourses on government, found unpublished in his closet, were construed into treason, and declared equivalent to another witness. It was vain for Sidney to plead that papers were no legal evidence; that it could not be proved they were written by him; and that, if they were, they contained nothing treasonable. The defence was overruled; he was declared guilty, condemned, and executed. His attainder was reversed in the first year of king William.

He was a man of extraordinary courage; steady even to obstinacy; of a sincere but rough and boisterous temper. Though he professed his belief in the Christian religion, he was an enemy to an established church, and even, according to Burnet, to every kind of public worship. In his principles he was a zealous republican: government was always his favourite study; and his essays on that

subject are a proof of the progress which he made in it.

SIDON (anc. geog.), a city of Phœnicia in Asia, famous in scripture for its riches, arising from the extensive commerce carried on by its inhabitants. Heavy judgments were denounced against the Sidonians on account of their wickedness, which were accomplished in the time of Ochus, king of Persia: for, that monarch having come against them with an army on account of their rebellion, the city was betrayed by its king; upon which the wretched inhabitants were seized with despair; they set fire to their houses, and 40,000, with their wives and children, perished in the flames. This city is now called Said. See below.

SIDON, or SAID, a seaport of Palestine, anciently a place of great strength, and extensive trade. It is still of some note, has a good castle, and a well-frequented harbour, and is the residence of a Turkish bashaw. It is 45 miles W.S.W. of Damascus. Lon. 36. 5 E. Lat. 33. 33 N.

SIDUS (Georgium). See ASTRONOMY, GEORGIAN, and HERSCHELL.

SIEGBURG, a town of Westphalia, in the duchy of Berg, subject to the elector palatine. It is seated on the Sieg, 15 miles S.E. of Cologne. Lon. 7. 22 E. Lat. 50. 43 N.

SIEGE, in war, the encampment of an army around a place, with design to take it, either in the way of distress and famine, by making lines all around it, to prevent any relief from without; or by main force, as by digging trenches, and making formal attacks.

The word is French, and signifies literally, seat; alluding to the army's taking its seat before a town, till the reduction of the place.

The most celebrated sieges of antiquity are those of Troy, Tyre, Alexandria, and Numantium; and, among the moderns, those of Ostend, Candia, Grave, Bergen-op-zoom, Gibraltar, Valenciennes, &c.

SIEGEN, a town of Germany, in Weteravia, with a castle, and the title of a principality, which it gives to a branch of the house of Nassau. It is seated on the Sieg, 17 miles N.W. of Dillemburg, and 37 E. of Cologne. Lon. 8. 5 E. Lat. 50. 53 N.

SIEGMARINGEN, a town of Suabia, capital of a county of the same name. It is 26 miles N. of Constance, and 44 S. of Stutgard. Lon. 9. 10 E. Lat. 48. 2 N.

SIENIT, SIENITE, SYENITES: in mineralogy, a species of granite. See GRANITES.

SIENNA, a celebrated city of Tuscany, capital of the Siennese, with an archbishop's see, a university, and a citadel. It is about four miles in circumference, and surrounded by a wall. The Gothic metropolitan church is built with black and white marble, and the pavement is of mosaic work. Sienna is not very populous; but is adorned with a great number of palaces, fountains, and superb churches. The great area is round, and the houses about it are of the same height, supported by piazzas, under which people may walk in all weathers. In the middle is a basin, which they can fill with water at any time, and represent a seafight with small vessels. The Italian language is taught here with such purity, that many foreigners frequent it on that account. Sienna is seated on three eminences in a most fertile soil. Lon. 11. 11 E. Lat. 43. 10 N.

SIENNESE, an Italian duchy, of which Sienna is the capital. It is about 55 miles long and nearly as broad.

SIERRA LEONE, a country on the W. coast of Africa, so named, according to some authors, by the Portuguese, on account of its mountains on this coast abounding with lions. Some extend its limits from the Grain Coast on the S.E. to Cape Verga or Vega on the N.W.; that is, between 7 and 10° N. latitude. Others, however, confine the country between Cape Verga and Cape Tagrin. In the open and plain parts, on the banks of a river of the same name, the heat of the sun, before any breeze arises, is almost intolerable; but as a refreshing gale constantly springs up about noon, it renders the country supportable. The whole tract, on each side the river, is rich in rice and millet, which is the chief sustenance of the inhabitants; and, upon the whole, it is one of the best countries on the coast. The negroes are in general of mild external manners, and noted for their hospitality; but they possess a great share of pride, and are easily affected by an insult. Of all the tribes, those who have embraced mahometanism are the most civilized and respectable; and those on the coast, from their intercourse with the European slave-factors, are much inferior in every thing, except the art of making a bargain, to those who reside higher up the country.

SIERRA LEONE, a river of Guinea, in a country of the same name. Its source is uncertain; but its mouth, at Freetown, is nine miles wide. In 1791, an act of parliament was obtained, incorporating a company, called the Sierra Leone company, for the purpose of cultivating West India and other tropical productions on the banks of this river. The first settlers amounted to 200 white persons, beside a number of free blacks from Nova Scotia. In 1793, the colonists were all put into possession of small lots of land, and a new town, on a regular and extended scale, was begun to be built. The next year a French squadron destroyed the settlement, and captured several of the company's ships: from this disaster they recovered; and a factory was established in the Rio Pongos, in 1795. The colony, however, still continued to languish, and, in 1808, it was transferred from the company to his majesty.

SIERRA MORENA, mountains of Spain, which divide Andalusia from Estremadura, and New Castile. They are rendered famous by the wars of the Christians and Mahometans, and for being the scene where Cervantes has placed the most entertaining adventures of his hero.

SIEVE, *s.* (from *sift.*) Hair or lawn

strained upon a hoop, by which flour is separated from bran, or fine powder from coarse; a boulter; a searce (*Dryden*).

SIEUR, a title of respect among the French, like that of master among us. It is much used by lawyers; and often by superiors in their letters to inferiors; for which reason authors sometimes use it by way of modesty when speaking of themselves. Thus, at the heads of books we see, Traduction du Sieur d'Ablancourt, &c.

To SIFT. *v. a.* (ꝛıꝑꝛan, Saxon; *siften*, Dutch.) 1. To separate by a sieve (*Wotton*). 2. To separate; to part (*Dryden*). 3. To examine; to try (*Hooker*).

SI'FTER. *s.* (from *sift.*) He who sifts.

SIG was used by the Saxons for victory; as *Sigbert*, famous for victory; *Sigward*, victorious preserver (*Gibson*).

SIGARA, in the entomology of Fabricius, a tribe of the hemipterous genus NEPA, which see.

SIGESBECKIA, in botany, a genus of the class syngenesia, order polygamia superflua. Receptacle chaffy; downless; outer calyx five-leaved, proper, spreading; ray halved. Three species: sigesbeckia orientalis, a native of India and Mexico; sigesbeckia Iberica, of Iberia; sigesbeckia flosculosa, of Peru.

SIGESBECKIA ORIENTALIS. The systematic name of a plant which is said to be useful in removing strangury, and in calculous diseases, gout, and fluor albus.

To SIGH. *v. n.* (ꝛıcan, ꝛıcꝛꝛan, Saxon; *zuchten*, Dutch.) To emit the breath audibly, as in grief (*Dryden*).

To SIGH. *v. a.* To lament; to mourn (*Prior*).

SIGH. *s.* (from the verb.) A strong and audible emission of breath which has been long retained, as in sadness (*Taylor*).

SIGHING, an effort of nature, by which the lungs are put into greater motion, and more dilated, so that the blood passes more freely, and in greater quantity, to the left auricle, and thence to the ventricle. Hence we learn, says Dr. Hales, how sighing increases the force of the blood, and consequently proportionably cheers and relieves nature, when oppressed by its too slow motion, which is the case of those who are dejected and sad.

SIGHT. *s.* (ȝeꝛıðe, Saxon; *sicht, gesicht*, Dutch.) 1. Perception by the eye; the sense of seeing (*Bacon*). 2. Open view; a situation in which nothing obstructs the eye (*Dryden*). 3. Act of seeing or beholding; view (*Locke*). 4. Notice; knowledge (*Wake*). 5. Eye; instrument of seeing (*Dryden*). 6. Aperture pervious to the eye, or other points fixed to guide the eye; as *the* sights *of a quadrant* (*Shakspeare*). 7. Spectacle; show; thing to be seen (*Pope*).

SIGHT. Hearing is the perception of the vibrations of the air; sight perceives those of light: the organ of hearing is bony, that it may admit of resonance; the organ of vision chiefly consists of humours, which refract: the complex nature of this organ was rendered necessary for the defence of parts so very tender, and by the diversity of the humours, to be contained each in its proper integuments.

The most external defence of the eye is afforded by the eye-brow, which is a protuberance of the skin, sustained by muscles, at the bottom of the forehead, full of thick imbricated hairs, and along with the frontal muscle, capable of being pulled down by the action of the corrugator, and orbicular muscles, so as to afford a shade to the eye in too strong a light. After the eye-brow has completed its functions, it is again raised by the frontal muscle, which is inserted into it, thin and fleshy, immediately under the continuous skin, fastened to the cellular membrane of the skull, which is shining, not very unlike an aponeurosis, and is drawn backwards by the rectangular occipital muscle. The depression of the eye-brow denotes care, its elevation tranquillity, and serenity of mind. It also turns aside the course of the sweat, and keeps off insects from the eye.

The eyelids furnish a nearer protection to the eye. These are folds of the skin, proceeding from that of the face, extenuated, lengthened out into an edge, as if divided, reflected upon itself, and retracing the course of the former lamina, from which it is separated by some cellular substance; then having become membranous, vascular, and therefore red and thin, it is carried over the ball of the eye, under the denomination of conjunctiva tunica, and covers the anterior portion of the sclerotica, and finally the cornea. The epidermis accompanies it in its whole course, even where it adheres to the cornea. The upper eyelid is larger, and more moveable: the lower is smaller; and rather passive, than moved by any power of its own. The nerves which give sensibility to the eyelids, are numerous, from the first and second branches of the fifth pair, and from the portio dura of the seventh; they abound with arteries from the ophthalmics, temporals, branches of the internal maxillaries, infra-orbitals, and facials.

That the eyelids may shut together more exactly, each of them has a cartilaginous arch, called tarsus, upon that margin which touches the other. It is slender, of a lunar figure, extenuated outwards, and stretches the eyelid, preventing the formation of folds while it is elevated or depressed. The elevation of the upper eyelid is performed by a peculiar muscle, arising from the involucrum of the optic nerve gradually spreading, and continued by its expansion to the tarsus. This is considerably assisted in its action by the frontalis, which is variously connected with the orbicularis, and draws it upwards. The upper eyelid is depressed by the orbicularis, as it is called; a broad muscle, both widely expanded around the orbit, and contained in the eyelids, carried as far as both angles of the eye, and having, as fixed points, the ligament adhering to the process of the maxillary bone, and some fibres inserted into the frontal and upper jaw-bone. The same muscle elevates the lower eyelid, and covers the eye in such a manner that no dust or light can enter it during sleep. The lower eyelid is depressed by two bundles of fibres, inserted into the upper lip.

Finally, that the tumid margins of the eyelids may not shut too closely, they are provided with eyelashes, or fringes of hair spreading outwards, proceeding in many rows from the edges of the eyelids, which, by decussating each other, in-

crease the shade and obscurity. These are of use in more distinct vision, by excluding the extraneous rays, when we require a distinct representation of any object.

The eyelids are prevented from hurting each other by the sebaceous glands of Meibomius, consisting of thirty or more follicles in each eyelid, which are simple, bifid, or trifid; placed in general according to the length of the lid, and composed of peculiar blind roundish cavities, which unite into one larger serpentine duct, of which the orifice is in the margin of the eyelid itself. These discharge a soft unctuous liniment, which mixes and washes off with the tears.

But the perpetual attrition caused by the eyelids ascending and descending against the globe of the eye is prevented, the delicacy of the cornea is preserved, and any insects and other irritating substances which may have got into the eye, are washed away by the tears; a saline, pellucid, and evaporable liquor, which never ceases to be poured over the anterior surface of the eye, but never runs over the cheeks, unless accumulated from some cause. This liquor is exhaled partly from the arteries of the conjunctiva, as we see from an imitation of nature by injecting water: and in part it is believed to proceed from a gland seated in a hollow recess of the os frontis, somewhat hard, and of the conglomerate kind; divided into many lobes, intermixed with fat, and supplied with many blood-vessels from the ophthalmics and internal maxillaries; and pervaded by many nerves arising from a peculiar branch of the first trunk of the fifth pair.

From this lachrymal gland six or more visible ducts descend, which open on the inner side of the conjunctiva of the eyelid. In man these ducts have been lately discovered by credible authors. The secretion of the tears is increased by the repeated contractions of the orbicular muscle, either from irritation, or some depressing passion, by which means the tears are conveyed over the whole eye, and the surface of the conjunctiva is washed.

After the tears have performed their office, some part of them being evaporated by the air, the rest, that they may not prove injurious by their accumulation, are propelled, by the orbicular muscle, towards its origin next the nose, and to the innermost part of the commissure of the eyelids; which from not having any tarsus, does not meet exactly together. There a caruncle, full of sebaceous hairy follicles, oblong, and conical outwards, interposes itself between the eyelids, and prevents them from meeting, and anoints with its liniment those parts of the eyelids which have no Meibomian ducts. Before it, a small third eyelid descends perpendicularly, and joins the true eyelids; it is larger in beasts. At the beginning of this space interposed between the eyelids, in which the tears are collected, in each margin a little papilla projects, having one orifice, surrounded by callous cellular substance, and perpetually open, unless when convulsively closed. This orifice, which is called the punctum lachrymale, absorbs the tears from the sinus in which they are collected, partly by attraction, and partly by the impulse of the orbicular muscle. If these points are obstructed, the tears run over and excoriate the cheek.

From each point, a peculiar duct, much wider, thin, and included in the skin, proceeds, the one downwards above the caruncle, and the other more transversely inwards, and under it; which approach each other, and are inserted by two mouths into the lachrymal sac, not quite at the top; which name is given to a cavity formed in the groove of the os unguis and upper jaw, lined first with a hard cellular, and as it were aponeurotic, membrane; then by another, red and pulpy, continued from the membrane of the nares, previous to the exhaling moisture, and somewhat of an oval figure. From this vesicle the nasal duct descends a little backwards into the nares, and opens by an obliquely oblong aperture, covered by the lower os spongiosum, into their lowest meatus. Through this the superfluous tears descend into the nose, which they in part moisten. A muscle is by some ascribed to this sac; but it is not yet sufficiently ascertained.

The eye, of a globular shape, compressed before, though not always in the same manner, longer from the brain to the cornea than from the right side to the left, is situated in the orbit, which is an osseous cavity, almost conical, composed of seven bones, interrupted in the back and outer sides by larger fissures, and widening forwards, and by which it is defended on all sides. But as this is larger than the eye, it is filled by much very soft fat, surrounding the globe of the eye, and allowing it free motion.

The eye begins from a nerve, by the expansion of whose coats those of the eye are formed. Its origin we have already described. Having passed across the crus of the brain, it joins with its fellow from the other side, and coheres with it for a considerable way, by much medullary substance; yet so that the right goes to the right eye, and the left to the left, though not without some reciprocal intermixture of medulla. The nerve then enters the orbit, a little inflected, and of a round form, somewhat compressed; and is inserted, not into the middle of the globe of the eye, but a little nearer to the nose.

The nerve having reached the eye, the inner plate of its dura mater, which it received in the opening of the sphenoidal bone, is detached: or having become thicker, is extended around the eye, as its first coat, called the sclerotic, or adheres to the sclerotic, which perfectly resembles it, and always arises from it. The other plate of the dura mater, the external, recedes and forms the periosteum of the orbit: the pia mater, which is in this nerve very distinct and full of vessels, having become entirely dark coloured and thin, lines the inside of the sclerotic. The remaining medullary central part of the nerve, continued from the brain, but divided by cellular plates, contracts into a depressed white conical papilla; which entering through the holes in the white circle of the choroid coat, and again expanding, produces the most internal membrane of the eye, the retina.

The sclerotica is in general white, furnished with few vessels, tough and compact, resembling the nature of skin, of a figure very nearly globular, but compressed before, and is thicker at the back part. Before this coat, which is perforated by circular holes in its fore part, is placed, and obliquely connected with it, a more convex portion of a sphere; pellucid, composed of many plates, whose vessels are filled with pellucid water, and are difficult of demonstration, insensible, and almost circular, circular towards the nose, and oval towards the temples: it is termed the cornea, and through it the light passes into the inside of the eye. It readily imbibes and

exudes water. Before the anterior and flatter part of the sclerotica, and before the cornea, the conjunctiva is detached from each of the eyelids, and is joined to the sclerotica by proper cellular substance, which may be inflated; and is replenished, partly with red vessels, and partly with their pellucid continuations.

The origin of the choroid coat is from the circumference of the white cellular circle, terminating the substance of the optic nerve, and through whose numerous foramina, and from which the retina and arteria centralis retinæ proceeds. At that place the choroides adheres to the sclerotic, and to the circle above described. Then it is expanded concentrically, within the sclerotic, with which it is united, perhaps by some cellular substance, and by many vessels, which come from it to the choroides. Outwardly it is of a brown colour, but inwardly of a deep russet or almost black, and at the same time villous; the two surfaces are separable by maceration; and the innermost may be distinguished by the name of Ruysch; but it grows white through age. When it has reached the beginning of the pellucid cornea, it there becomes closely connected with the sclerotica, by much cellular substance, having the appearance of a white circle, called orbiculus ciliaris, and then turns off in another direction; namely, the coat, which was before spherically expanded, is now stretched under the arch of the cornea, in the form of a circle, a little convex forwards, and incomplete, having in its centre a circular foramen called the pupil, which is seated nearer to the nose, and is larger towards the temple. The anterior part of this ring is called the iris; and the back part, separable from the former in the human body, by maceration, in some animals even by the knife, is, from the black pigment with which it is covered, called the uvea. On the anterior surface of the iris appear numerous radiating and branching streaks, of various colours in different people, and entirely covered with flocculi. These terminate on this side of the pupil in a serrated circle, from which other similar streaks extend, even to the edge of the iris. They are serpentine when the pupil is dilated, and straight when it is contracted. On the posterior surface of the uvea is much black pigment; which being washed off, straight radiated streaks appear, extending to the pupil, and not flocculent. Orbicular fibres, concentrical with the pupil, have not been observed, either with the naked eye, or with the microscope, even in the ox; but only in the uvea, an internal circle distinguished by obscurer rays, and less villous. In the human fœtus the pupil is shut up, and the iris being continued, makes a complete circle. That part of it which extends across the pupil is of a vascular texture.

Though the iris has little sensibility, and is not endowed with any mechanical irritability; yet during life, in man, quadrupeds, and birds, the pupil is contracted by every greater degree of light, and is dilated by every smaller one; hence it is also rendered broader for viewing distant objects, and narrower for viewing such as are near. The cause of this dilatation seems to be a remission of the powers resisting the aqueous humour; as proved by the dilatation of the pupil, from debility, syncope, and death. The contraction is less understood, and perhaps only depends on the stronger afflux of humours into the colourless vessels of the iris, by which these vessels are extended: and, at the same time, the iris is rendered longer, and shuts up the greater part of the pupil: so that this motion has something in common with inflammation, as agreeing in their cause. In young people, the pupil is more evidently moved and contracted; as the eye gradually grows callous in old people, it becomes almost immoveable. In an animal twenty-three hours after death, the iris has been seen extended by heat so as to shut the pupil.

Behind the uvea, from the same circle in which the choroides unites with the sclerotica, more externally than the cornea, thick striæ, elegantly plaited, arising from the choroides, white, with parallel vessels running under them, with plumous, pendulous, extremities, joined to the loose and thin retina, and every where covered with a good deal of black pigment, depart, in the form of a perforated ring, inwards from the tunica choroidea, and proceed forwards behind the ciliary circle, and rest upon the vitreous humour; and, lastly, upon the capsule of the crystalline lens, but do not adhere to them. They are denominated the ciliary ligaments. The origin of the pigment is not known; nor have the secreting glands, which some have supposed, been found. Among its uses, one seems to be to keep the crystalline lens firm. In infants, this same mucus, behind the ciliary processes, expresses the figure of a radiated flower.

The retina, which is a true continuation of the medulla of the optic nerve, and therefore very tender, mucous and evaporable, is expanded within the choroides into a similar sphere, concentric with it; and immediately incloses the vitreous humour. But when the retina has reached the ciliary processes, it follows their course, supporting their arteries and striæ, and proceeds to the crystalline lens, adhering to and covering its capsule, if the observations of some anatomists are to be relied on; for in quadrupeds this termination of it is not perfectly certain, although in birds the internal lamina of the retina, covered with the ciliary body, evidently continued to the crystalline lens; to the circumference of which it also adheres in man. The fabric of the retina is such, that externally its soft and medullary globules form a thick and pulpy membrane, within which radiated fibres proceeding from the lamina cribrosa, and continued forwards, constitute a thinner involucrum, very readily observed in fishes, and also in some birds and quadrupeds, but not in man. Arterial and venous vessels with red trunks, form a net in the internal surface of the retina, which when accurately filled with coloured water compose a membrane.

These coats, resembling the coats of a bulbous root, are supported, and the spherical figure of the eye is preserved by its humours: of which one is a solid, another a soft body, and a third truly a liquor. First, then, the concave surface of the retina is every where filled by the principal or vitreous humour, of which the structure consists of a peculiar thin, pellucid, cellular membrane, in whose cellular intervals is contained a very pellucid liquid, very rarely altering even in old age, completely evaporable by heat, nearly allied to the aqueous humour, and somewhat denser than water. Its vessels, which are most manifest in fish, lie in the back part, most beautifully radiated from the central trunk of the retina, embracing the convexity of the vitreous humour; and inserted into a circle formed not far from the lens by other arteries coming from

the choroides, and which may be seen in the sheep. The vitreous membrane, which is tender, considering its body, adheres to the lens in two places, before and behind; so that a hollow space is intercepted in the middle between the two insertions, around the crystalline lens. This space is divided in different places by some fibres. On its anterior surface the striæ of the ciliary body imprint their marks.

But, in the fore part of the vitreous body, behind the uvea, there is an orbicular depression of considerable depth, into the cavity of which the crystalline lens (also, though improperly, ranked amongst the humours), is received. The figure of this lens, resembling frozen jelly, is composed of two elliptical convex segments, the anterior of which is flatter, and the posterior more gibbous. It is constructed of concentric laminæ, connected by cellular fibres, which themselves are composed of fibres elegantly disposed through fine cellular membrane. Betwixt the plates of the crystalline lens is also contained a pellucid liquor, but which in old age naturally acquires a yellow colour. The innermost scales are more closely compacted; and forms as it were, a harder nucleus; externally it adheres so very loosely to the capsule, that when that is broken, it very readily springs out; and some even say, that a little water is effused around it. It is supplied with an artery from the retina, which perforates the middle of the vitreous humour; and enters behind; for vessels have not yet been discovered on the anterior surface. The whole lens is contained in a strong, thick, elastic capsule of a pellucid membrane, more firm in the fore part, and which is lined posteriorly by the vitreous tunic.

Lastly, the aqueous humour, which is extremely pellucid and fluid, and which is renewed again if it be let out, swims in the small triangular curvilinear space betwixt the uvea and crystalline lens, and in that larger segment of a hollow sphere which lies betwixt the iris and the cornea. This humour seems to exhale from the small arteries of the iris, uvea, and ciliary processes; being again absorbed by the corresponding veins, while some portion of it is absorbed by and exhaled through the cornea. This humour also moistens the uvea, and capsule of the lens. About the beginning of the last century, the spaces filled with this liquor were called the chambers of the eye; that between the cornea and iris the anterior one, and that small one between the surface of the crystalline lens and the uvea the posterior.

The eye, thus constructed, is provided with muscles externally inserted into it, by which it is governed. Namely, into the circle of the sclerotica, which is contiguous to the cornea, are inserted four straight muscles, arising almost in one circle from the dura mater of the optic nerve; where, departing from the nerve, it coheres with the periosteum of the orbit, and proceeding forwards, with their bellies round the bulb of the eye, they terminate again by their aponeurosis, meeting together in another circle. Of these, the elevator is the least, and the abductor rather the longest. The office of each of these muscles appears very plainly; since, being bent round the convex bulb of the eye, as about a pulley, they must, of course, elevate, depress, or turn the eye either to the nose or to the temples. Moreover, two of them acting together may move the eye diagonally; as upwards and outwards, upwards and inwards, &c. Lastly, when all the four straight muscles contract together, there is scarcely a doubt that they draw back the whole eye within the head towards their origin, and thus bring the crystalline lens nearer to the retina.

But the fabric of the two oblique muscles of the eye is more compound. The upper of these, arising together with the recti, is long and slender, ascending forwards to a notch in the os frontis, which is completed into a hole by a double ligament, which on each side sustains a cartilage, excavated in the middle, and almost quadrangular. Through this canal passes the tendon of the obliquus, which being reflected backwards and outwards, included in a capsule of its own, is inserted into the globe of the eye behind the straight muscles. This draws the globe forwards, as if out of the orbit, and inwards, and turns the pupil inwards and downwards. The other, the obliquus minor from the sinus of the lachrymal foramen in the upper jaw, ascends immediately outwards from the os unguis round the globe of the eye, and is inserted by its tendon into the sclerotica behind the external rectus; whence it appears to turn the point of its insertion into the eye downwards and outwards; and, therefore, the opposite pupil upwards and inwards.

But there are other minute muscular motions performed in the eye, which presuppose a knowledge of its nerves. Of the optic nerve we have already treated. The fourth pair goes only to the larger oblique muscle, and the sixth pair to the rectus externus. The third and fifth pair produce the principal nerves in the eye; the first or ophthalmic branch of the fifth sends off a nerve at its entrance into the orbit, to the eyelid and lachrymal gland, which joins with the second branch of the fifth pair, and with the temporal branch of the third of the fifth pair. On entering the orbit, its trunk divides into two. The upper branch, larger and bifid, is expended on the forehead and eyelids: but the lower, penetrating inwards above the optic nerve, sends off a long slender filament at the outer part of that nerve, which, joined with another filament of the third pair, forms the ophthalmic ganglion, and sends off one or two ciliary nerves. Finally, after having given off the recurrent nerve of the nose, it is then spent upon different parts in the internal angle of the eye.

But the third pair is of most importance. After giving off a branch upwards to the straight muscles of the eye, and to the eyelids, it proceeds with its trunk under the optic nerve, and at the same time sends out three branches to the inferior, and obliquus minor, and internus; after this, or before, from its trunk, or sometimes from the branch of the obliquus minor, it sends off another short nerve, much thicker than the root from the fifth, which, under the abductor muscle upon the optic nerve, forms the ophthalmic ganglion, which is oval and constant, and sometimes arises from the third alone. From that ganglion, and sometimes from the trunk of the third or fifth, four or five ciliary nerves playing around the optic nerve in a flexuous course, go to the globe of the eye, perforate the sclerotica almost in its middle, in company with its longer small arteries or veins, run straight forwards along the choroides, and visibly proceed to the iris, and seemingly to the ciliary processes. Other very small nerves, originating from the same ganglion, remain in the tunica sclerotica.

The motion of the ciliary processes is obscure

and difficult of demonstration; lying incumbent upon the furrows of the vitreous membrane, by their action they are believed to press back that body, so as to bring the lens forwards, and remove it farther from the retina. But in all the animals which have been dissected, nothing like a muscle in this ciliary body, but only a membrane which supports small vessels is seen. The sphincter of the pupil, and constrictor of the cornea, mentioned by some writers of eminence, and the moving fibres, which others have imagined proper to the crystalline lens, are not confirmed by anatomy, nor are they consistent with the constant hardness of the lens and cornea in most animals.

The history of the eye also comprehends its vessels, which have a most beautiful fabric. All those which belong properly to the eye itself come from the ophthalmic artery, a branch of the internal carotid. This, creeping under the optic nerve, sends off, as principal branches, the upper ciliary, one or more inferior ciliaries; the lachrymalis, from whence arises the nasalis recurrens posterior, and internal part of the arch of the tarsus; afterwards the muscularis inferior, the nasalis recurrens, anterior and posterior, the musculares superiores, and the palpebralis, which, with the former branch, forms the arch of the tarsus. Lastly, it goes to the face, nose, and adjacent parts. But the ophthalmic branches belonging to the inner parts of the eye are called the ciliaries; which arising from the trunks now mentioned, and playing around the optic nerve in four or more branches, in a serpentine course, partly close by the entrance of the optic nerve, go to the choroides with forty or more branches, and make upon its external surface ramifications divided at acute angles, which proceed forwards to the circle of the uvea.

But most of the small arteries of the tunica choroides gradually incline towards the interior parts of the eye; and, being covered with a kind of cellular down, go to the ciliary processes, along each of which two small arteries run, giving off on every side, vasculi flocculi, and inosculating at their apex.

Other small arteries also, likewise arising from the ciliary ones, but few in number, most commonly two, go to the place from which the uvea originates. There, spreading in various directions, they surround the root of the uvea with their branches, and join to form a circle, into which the anterior ciliaries inosculate; which are small arteries arising from the muscular branches of the ophthalmic; and are inserted into the circle generally by twelve small trunks, near the origin of the cornea. From that circle, and likewise from the above-mentioned anterior ciliary arteries, without the intervention of the circle, straight, branched vessels are distributed, both on the iris and on the uvea; the former full of a blue or dark coloured fluid; and the latter naturally white, but covered with a good deal of a black paint. In the uvea, at some distance from the pupil, they frequently form an imperfect circle.

But from the same ophthalmic artery, from its trunk, or from the lachrymal branch, or from one of the ciliaries, one or more branches enter into the optic nerve; the principal, the central artery of the retina, penetrates into the medulla of the nerve, and passing through the apex of the papilla, enters the centre of the retina; from thence it spreads every way through the retina itself, by so many branches, when traced by a skilful anatomist, that that vascular net work has been taken for a peculiar membrane. Sometimes a small branch goes along the centre of the nerve to the retina, and is in like manner ramified through it. From comparative anatomy, it is certain, that from these branches the vascular branches of the vitreous tunic are produced, as well as the posterior artery of the lens. The most internal of these arteries is the celebrated porus opticus of the ancients.

The veins of the eye, in general, arise from the ophthalmic vein, which on the one side comes from the facial vein, entering the orbit; and on the other, is inserted into the cavernous sinus. The internal veins of the eye perforate the middle of the sclerotica, with fewer and larger trunks than the arteries, and form larger and more anterior reticulations, of a roundish figure, which commonly occupy the middle of the tunica choroides: some, which are long, are continued to the origin of the uvea: others anterior, similar to the arteries: and another, the centralis nervi optici, corresponding with the artery, goes to the retina. The pellucid vessels do not differ from the sanguiferous. Lymphatic vessels are said to have been seen in the retina; but the observation has not been sufficiently repeated.

So far with respect to the anatomy; but the action of the eye is entirely elucidated by physical experiments, from which it has been ascertained, in the most incontrovertible manner, except a few doubtful points. Light is the same matter with heat, or very nearly the same, possessing extreme fluidity and subtility, penetrating through all bodies, very rigid, not exhausted by any distance of its passage, and moving with excessive velocity, so as to arrive at the earth from the sun in eight minutes and thirteen seconds. Light in our planet proceeds either from the sun, which seems to have the power of arranging in straight lines the matter of light, otherwise confusedly scattered; or from some other lucid point. From it, as from a centre, the light is distributed like rays, to all parts of the sphere, so as to fall upon the surfaces of all bodies; from whence again it is reflected, and impinges on the eye, at angles equal to the angle of incidence, and renders the bodies, from which it comes, coloured and visible.

It is ascertained from experiments, that light is composed of rays in right lines, almost without any physical breadth; and yet, each of which may be separated into seven more minute, permanent, and immutable rays. The known properties of these rays are, that all of them conjoined together constitute a white beam: but when refracted, and separated by the minute surfaces of bodies, they are subdivided into red rays, which are the most constant, hard, and least refrangible; and afterwards into orange, yellow, green, blue, indigo, and violet; which are always weaker and more refrangible, as they are farther distant in order from the red rays. Shade arises from a deficiency of reflected rays. Colours are compounded of shade united with various rays.

The peculiar colours of bodies arise from the minute surfaces of their solid particles, by which their pores are limited, which refract the rays of light, according to the difference of their thickness, reflecting one kind of rays most copiously, and in a great measure suffocating, by repeated internal refractions, the others admitted into their substance; so that the thickest and densest

Particles reflect a white colour; the next red; and the thinnest violet. Bodies are opaque, which retain all the rays, and transmit none, from the largeness of their pores, to the sides of which the light is attracted; and which are filled with some matter that has a power of refraction different from that of the particles of the body. These principles we embrace, till a new theory, which ascribes the diversity of colours to vibrations of different celerities, shall be better established; for it is not our business to ascertain these matters.

These rays, when they fall obliquely upon liquors of various densities, in passing through them variously recede from, or incline towards the perpendicular; this is called refraction. In general, the denser the medium the more are the rays bent towards the perpendicular; excepting only inflammable liquors, which, by a peculiar property, attract the rays more to the perpendicular, than in proportion to their density. The proportions of the angles of incidence to those of refraction, are constant; so that the sine of the angle of refraction of rays passing from air into water, is to the sine of the angle of incidence, as 3 to 4: and of rays passing from air into glass, the sine of the incidence is to that of refraction, as 17 to 11; and from water into glass, as 51 to 44.

Rays, which come through the air with but little divergency, as those of the sun on account of its immense distance; or as, in general, any rays that come from a distance of above 100 feet, when they fall upon a body, spherically convex, and denser than the air, at a large angle, as at 48½ degrees; are reflected, and do not penetrate it. If the angles are smaller, they penetrate the refracting medium, and are refracted in it, so as to meet together in one point, which is called their focus. This point lies in the axis, or in the ray, falling perpendicularly on the surface, and therefore not inflected; and in a spherical globule of water, the focus of rays coming from the atmosphere, is at the distance of one semi-diameter from the sphere; and in a sphere of glass, a fourth part of the diameter, and in a convex lens of glass, that is, a part of a sphere not less than thirty degrees, and equally convex, it is also one semi-diameter; but so that the rays meet, not in a point, but in a little circle.

Therefore the rays of light, whether direct or reflected, fall in such a manner upon the cornea of the eye as to form a very acute cone, from the lucid point to the surface of the membrane; the basis of which is the surface of the cornea, and the apex the radiant point; yet so, that the rays of the cone may be considered parallel, without any sensible error. Of these rays, all those which fall upon the cornea at a greater angle than forty degrees are reflected from the cornea without penetrating its surface. Others which enter the cornea, but still at large angles, fall in betwixt the uvea and sides of the crystalline lens, and are suffocated in the black paint that lines the uvea and the ciliary processes; and those rays only fall upon the surface of the lens, which enter the cornea at small angles; not much distant from the perpendicular, or at about twenty-eight degrees. By this means, all those rays are excluded, which the refracting power of the humours in the eye could not have been able to collect into one point of the retina; and which, therefore, would have painted the image on the retina too broad and confused.

Those rays, therefore, coming from the air, which is so thin, and passing through the cornea, which is the segment of a sphere, thick, denser than water, and, therefore, almost a fourth part more refracting, are remarkably inclined towards the perpendicular. By the aqueous humour, which is small in quantity, and almost like water, but rather lighter, they are not altered, and fall upon the surface of the transparent lens, before they have formed a focus, because of its nearness, nearly parallel, or rather converging; because their divergency was abundantly corrected by the refracting power of the cornea. Moreover, the cornea being convex, and more prominent than the hemisphere of the sclerotica, receives and collects a greater number of rays than if its surface were flatter, and therefore smaller.

That the refracting power of the crystalline lens exceeds that of water may be understood from its hardness and weight, although we have no sufficiently certain measure. In this lens, therefore, and more especially in its posterior very convex surface, the rays converge very much, and pass thence into the vitreous body.

This substance is denser than water, since it sinks in it; but rarer than the crystalline lens; bends the rays a little more gently towards the perpendicular, till at length the rays, coming from a point of distinct vision, are concentrated into the smallest possible point of the retina, where they paint an image of the object from which they come; but inverted, on account of the necessary decussations. The manner in which the images of objects are thus painted may be seen in an artificial eye, or in a natural eye, when the back part of the sclerotica is removed. But the image is painted on the outer side of the entrance of the optic nerve, at the termination of the axis of vision, which is not limited to a mere point, but has some breadth, since we see many objects at once, whose images must be represented in different points. Vision is there more distinct, because the rays arrive thither nearly perpendicular. But frequently it does not fall on the same place in both eyes of the same individual. When the lens is destroyed, the vitreous humour alone collects the rays, though less powerfully.

Is it entirely false that the object is painted on the retina? Is the picture represented on the choroides? Is this new opinion confirmed by the experiment, by which it appears, that the place where the optic nerve enters is insensible? and which is thus explained, that there is in that place no choroides but only the bare retina, and that, therefore, it does not possess vision. Yet this is repugnant to a very well known observation, that the retina is a most sensible nervous medulla; and that the choroides almost entirely consists of a few small nerves, and of vessels which are most certainly blind. This is likewise contradicted by the very great variety of the choroides in animals; by the equally great uniformity of the retina; and by the black spots, which, even in man, obscure the exterior surface of the retina. But, by this experiment, we perceive the reason why the optic nerve is not inserted into the axis of the eye, but towards one side. For thus, except only in the single case, where an impediment is situated in the point of intersection of lines drawn through the centre of the optic nerves, the one eye sees and assists that whose blind portion is directed to the object.

But since the necessary functions of human life require that a distinct object be painted upon the

retina, not only by the rays which come from one certain distance, but likewise that rays which come from various and very different situations, more or less distant, should excite a distinct idea of the object from which they come: therefore, it is believed, that the necessary change is produced in the eye by proper means. Some celebrated anatomists have supposed the lens moveable by the powers before mentioned. They assert this art of changing the eye is learned by experience, and is not possessed by those on whom the operation of couching the cataract has been lately performed. Also, in an artificial eye, the advantages and necessity of this motion, it is said, may be plainly perceived. Therefore, too great a divergency of the rays, as in those which come from objects very close to the eye, is corrected by the removal of the lens farther from the retina, by which means the focus, which is more distant, on account of the divergence of the rays, falls upon the retina itself, which would otherwise have fallen behind the retina; for the refracting power of the eye being supposed to be such, as will cause the focus of rays coming from the distance of three feet to fall exactly upon the retina, it will not be able to collect together into the same point rays which come from the distance of three inches; and the more diverging rays, when not collected by more powerful means, will be too late of uniting.

But those rays which come from very remote situations, and may be therefore reckoned parallel, would meet in the vitreous humour before they reached the retina; and would again separate as rays from the point of concourse, as if from a lucid point: it is therefore believed, that the powers remove the crystalline lens from the cornea, and carry it nearer to the retina, that the rays may meet at a greater distance from the lens, and that that distance may be accommodated so as to fall upon the retina. For an eye, that will collect the rays coming from a distance of seven inches, on the retina, will collect those which come from a distance of three feet too soon, and before they reach the retina. So that it seems perfectly necessary for the eye to be made thus changeable, since we see distinctly at various distances. The point of distinct vision is that in which the given object is painted on the retina in the least space possible. The powers collecting the rays are often very different in the two eyes of the same person, so that the one eye is rather long-sighted, and the other short-sighted.

These and other similar opinions, commonly received, are taught, more especially by the mathematical physicians, who more obviously perceive the necessity of these changes. Yet there is no power in the human eye which can either move the crystalline humour from its place, or compress it. And we do not perceive this faculty in ourselves: for we move a book, which, by being too far off, we see confusedly, nearer to our eyes, which we would not do, if, by an internal change in the eye, we could correct the fault of the distance: and, through a small hole, we perceive an object only single in the point of distinct vision, but double in every other. Perhaps the contraction of the pupil may have some effect in enabling us to see near objects more distinctly.

But this adaptation is not sufficient in all persons: for there are, and now more commonly than formerly, persons leading a sedentary life, and occupied with the observation of very minute objects, in whom the cornea is more convex and dense; the crystalline lens more convex and solid; the eye itself, by the weight of the humours, more elongated; and the rest of the humours themselves probably more dense; and in whose eyes one, or several, or all of these diseases occur. In these persons, the iris is sensible in a small light; and therefore, from their winking, they are denominated myopes. In these, the point of distinct vision is very near to the eye, from one to seven inches from the eye; they see remoter objects obscurely, without being able to distinguish their parts. The reason of this is evident; since, from the causes just mentioned, the too great refracting power of the humours causes the distant and consequently parallel rays to meet before the retina; and therefore, diverging again from their focus, they fall upon the retina in many points. Thus also to a sound eye, the perception of near objects is confused; because the rays coming from these are spread all over the retina, without being collected.

The remedy, in the commencement of this disease, is to view distant places, to abstain from minute objects and concave glasses, and to look through a small aperture, by which the light is weakened. When the disorder is confirmed, it is alleviated by the use of a concave lens, which diminishes the refracting power in the humours, cornea, and crystalline lens, in proportion to its concavity; and thus removes the focus of distant objects farther from the cornea, so as to fall upon the retina. This glass ought to be a portion of a sphere, whose diameter is equal to the distance of distinct vision by the naked eye, squared by the distance of distinct vision in the eye furnished with a glass, and divided by the difference betwixt them. Short-sighted people may hope for some relief from the progress of life; for children are almost all myopes; but, as they grow older, the eye becomes flatter from the strength of the solids, it becomes shorter, and the converging powers of the lens and cornea are diminished.

Another defect, the opposite of the former, troubles people who are in the habit of looking much at very distant objects, and is especially frequent and incurable in old people. In it, the cornea and crystalline lens are flatter, and the humours of the eye have a less refracting power. Hence near objects, whose rays fall very diverging upon the cornea, appear to them confused; because the converging powers of the eye are not sufficient to collect the rays into a focus upon the retina, and the rays arrive at it scattered, and have their focus behind the eye; hence their vision is confused. The point of distinct vision among presbyopi is from fifteen inches to three feet.

Such persons are, in some measure, relieved by looking through black tubes, by the use of which the retina grows tenderer, and the rays come to the eye in a parallel direction. The remedy here is a convex lens of glass, which may cause the rays to converge, so as to meet sooner in a focus, and upon the retina. The diameter of the sphere of which such a lens ought to be a portion, is exactly as before. There is no hope from age, which increases the malady.

The medium betwixt the short and long-sighted eye is the best, with which a person can see distinctly objects that are tolerably near and tolerably remote, and therefore may assume the properties both of the myopes and presbyopi; of this kind we reckon an eye that is able to read distinctly at the distance of one foot. But other conditions are necessary, such as perfect clearness

of the humours; great mobility of the eyes; sensibility of the pupil; and a retina, neither too sensible nor callous.

But by means of the eye, the mind does not receive a simple representation of the image of the object on the retina, which is transferred to the seat of the soul; but many things are added from experience, which the eye does not really see, and other things are interpreted differently by the mind, from what they are represented by the eyes. And, first, the magnitude of an object is judged of by the optical angle intercepted between the radiating object as the vertical point, and the cornea as the base. From hence, things very near seem large, and remote objects small. To this may be referred the power of the microscope, by which objects are made to appear to us so much larger, as the distance of the focus of the glass lens is less than the distance of distinct vision; and, in reality, they do not appear larger, but only more distinct and lucid; whence the mind judges them to be nearer.

In the same external light, the strength of illumination depends upon the same angle, and upon the number of rays, joined with the smallness of the point which they affect in the retina; near objects therefore appear brighter, and distant objects more obscure; or if remote objects appear bright by their own light, the mind represents them as large, or near, or both.

The place of a visible object is estimated by one eye, to be in a line comprehended by two other straight lines drawn to the extremities of the body. If the same body is beheld with both eyes, it will then seem to be in the concourse of two lines drawn through the axis of each eye to the object.

We do not see distance; and a blind man, who has never seen, on acquiring the use of sight, imagines every thing he sees to touch him. After much experience, we at last make conjectures about distances, though always fallacious: but we judge of them both from the diminution of the known bulk of the body, and from the diminished strength of the light, and faint image of the object whose parts we distinguish less evidently, and from the number of bodies interposed, whose distance is known to us.

Convexity is not seen; but, from experience, a body is reckoned convex, after we have learned, that a body, which is convex to the feeling, causes light and shadow to be disposed in a certain manner. It is convex if the shade be in the side corresponding to the left hand, and concave if in the right. Hence it is, that microscopes frequently pervert the judgment, by transposing or changing the shadows. The same also happens in that phænomenon which is not yet sufficiently understood, by which the concave parts of a seal are made to seem convex, and the contrary.

The parts of a visible object are judged by the mind to have the same situation which they have in the object, and not inverted as they are on the retina. The mind possesses this power of correction, previous to experience in men who have been born blind, and in animals at birth, as appears by indubitable experiments upon men who had been blind from birth, and acquired the power of vision suddenly by the operation of couching.

Another false perception of the mind arises from this circumstance, that external sensations conveyed to the seat of the soul by the eyes are represented during almost the space of a second of a minute, to the mind as objects really present. Hence proceeds the idea of a fiery circle from the circumrotation of a lucid body; and hence the continuance of the image of the sun, and sometimes also of opaque bodies.

Do we perceive only that object distinctly which is directly before that part of the retina which sees most distinctly? And does the mind persuade itself, that it sees many objects at a time, partly from the duration of the ideas, and partly from the quickness of the motions in the eye? Concerning perfectly distinct vision, this is most certain; but we can hardly affirm it of that which is less distinct. Why do we see only one object with two eyes? Because the sensation is single, and without difference, when we have similar impressions of two objects. For, even without the decussation of the optic nerves, insects who have numerous eyes perceive objects single. Hence the images of two objects excite only one sensation in the mind, when they fall upon the same point of the retina; but two sensations arise from one object, when the images fall upon different parts of the retina of each eye. Whence proceed diurnal and nocturnal blindness? The latter is common to many nations living in the very warm climates, and under the vertical sun, and to old men. The former happens in inflamed eyes, and in young men of a hot temperament, and hence furnished with eyes vastly sensible. For great sensibility of the retina produces diurnal blindness; insensibility produces nocturnal blindness. How do animals see in the dark? From a large dilatable pupil, tender retina, and refulgent and very lucid choroides. Why do we become blind when brought out of a strong light into a weak one? Because the optic nerve, having suffered the action of stronger causes, is not affected by weaker ones. Why is the sudden translation from a dark place into the light painful? Because the pupil, being widely dilated, suddenly admits unawares too great a quantity of light, and the retina having been but slightly affected by the weak light, now feels the stronger impressions very acutely. Do we see with one eye, or with both? Most frequently with one, especially and generally the right eye: but, by the assistance of the other, we see more objects, and more plainly; and we also distinguish more points of the same object, and judge better of distances.

SI'GHTED. *a.* (from *sight.*) Seeing in a particular manner. It is used only in composition: as *quicksighted, shortsighted.*

SI'GHTFULNESS. *s.* (from *sight* and *full.*) Perspicuity; clearness of sight (*Sidney*).

SI'GHTLESS. *a.* (from *sight.*) 1. Wanting sight; blind (*Pope*). 2. Not sightly; offensive to the eye; unpleasing to look at (*Shakspeare*).

SI'GHTLY. *a.* (from *sight.*) Pleasing to the eye; striking to the view (*Addison*).

SI'GIL. *s.* (*sigillum*, Latin.) Seal (*Dryden*).

SIGILLUM SALOMONIS. (dim. of *signum*, a sign. It is called *sigillum salomonis*, Solomon's seal, because it has upon its root the resemblance of an impression made by a seal.) Solomon's seal. Convolvulus polygonatum; foliis alternis amplexicaulibus, caule ancipiti, pedunculis axillaribus subunifloris of Linnæus. The roots are applied externally as adstringents, and are administered internally as corroborants.

SIGMOID. (*sigmoides*, σιγμοειδης; from the Greek letter Σ, and ειδος, a likeness; resembling the Greek letter sigma.) In anatomy, applied to the valves of the heart, and sometimes to the cartilages of the aspera arteria, or the semilunar apophysis of the bones.

SIGN. *s.* (*signe*, French; *signum*, Latin.) 1. A token of any thing; that by which any thing is shown (*Holder*). 2. A wonder; a miracle (*Milton*). 3. A picture, or token, hung at a door, to give notice what is sold within (*Donne*). 4. A monument; a memorial (*Numbers*). 5. A constellation in the zodiac (*Dryden*). 6. Note or token given without words (*Luke*). 7. Mark of distinction; cognizance (*Milt.*). 8. Typical representation; symbol (*Brerew.*). 9. A subscription of one's name; as, *a* sign *manual*.

To SIGN. *v. a.* (*signo*, Latin.) 1. To mark (*Shakspeare*). 2. (*signer*, Fr.) To ratify by hand or seal (*Dryden*). 3. To betoken; to signify; to represent typically (*Taylor*).

SIGNS, in algebra, are those for plus, minus, and difference. See ALGEBRA, NEGATIVE, and CHARACTER.

SIGN, in astronomy, a twelfth part of the ecliptic, or zodiac; or a portion containing thirty degrees thereof.

The zodiac was divided by the ancients into twelve segments, called signs; commencing from the point of intersection of the ecliptic and equinoctial; which signs they denominated from the twelve constellations, which, in Hipparchus's time, possessed those segments. But the constellations have since so changed their places, by the precession of the equinox, that Aries is now got out of the sign called Aries, into Taurus, Taurus into Gemini, &c. See ASTRONOMY and ZODIAC.

The names of the twelve signs, and their order, are as follow: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces; each of which, with the stars thereof, see under its proper article, ARIES, TAURUS, &c.

The signs are distinguished, with regard to the season of the year when the sun is in them, into vernal, æstival, autumnal, and brumal.

SIGNS (The vernal or spring), are, Aries, Taurus, Gemini.

SIGNS (The æstival, or summer), are, Cancer, Leo, and Virgo.

SIGNS (The autumnal), are Libra, Scorpio, and Sagittarius.

SIGNS (The brumal, or winter), are Capricornus, Aquarius, and Pisces.

The vernal and summer signs are also called northern signs.

And the autumnal and brumal signs, southern signs.

SIGN MANUAL, the setting one's hand and seal to a writing. See SIGNATURE.

The expression is used when any bill or writing is signed under the hand of the king, &c. Counterfeiting the sign manual, privy signet, or privy seal, is treason. 1 Mar. stat. 2. cap. 6. See PATENTS.

Among the Saxons, before the invention of seals, a + was a common sign, or signum, prefixed to the names of most subscribing witnesses in charters, and other deeds: as + *signum Roberti Episcop. Lond.* &c. See SEAL.

SI'GNAL. *s.* (*signal*, French.) Notice given by a sign; a sign that gives notice (*Dryden*).

SI'GNAL. *a.* (*signal*, French.) Eminent; memorable; remarkable (*Clarendon*).

SIGNALS, certain signs agreed upon, for suddenly conveying intelligence to places, to which the voice cannot reach. Thus, in some countries, fires are lighted upon the hills, at the approach of danger: and at the beginning of a battle or in attack, signals are usually made with drums and trumpets. At sea they are given by firing cannon, or muskets; by lights, flags, sails, &c.

Signals at sea are made by the admiral or commander in chief of a squadron, either in the day, or by night, whether for sailing, fighting, or the better security of the merchant ships under their convoy: these are very numerous and important, being all appointed and determined by the lords of the Admiralty, and communicated in the instructions sent to the commander of every ship of the fleet or squadron, before their putting to sea. Some of the principal of which are as follow: when a commander in chief would have them unmoor, he looses his main-top-sail, and fires a gun, which, in the royal navy, is to be answered by every flag-ship, and every ship is to get under sail as soon as she can. When, in bad weather, he would have them wear, and bring to the other tack, he hoists a pendant on the ensign-staff, and fires a gun: then the leeward-most and stern-most ships are to wear first, and bring on the other tack, and lie-by, or go on with an easy sail, till he comes a-head. When any ship discovers land, he is to hoist his jack and ensign, and keep it abroad till the admiral answer him by hoisting his, on sight of which he is to haul down his ensign. If any discovers danger, he is to tack and bear up from it, and to hang his jack abroad from the main-top-mast cross trees, and to fire two guns: but if he should strike or stick fast, then, besides the same signal with his jack, he is to keep firing, till he sees all the fleet observe him, and endeavour to avoid the danger. When the admiral would have the vice-admiral to send out ships to chase, he hoists a flag striped white and red on the flag-staff at the fore-top-mast-head, and fires a gun: but if he would have the rear-admiral do so, he hoists the same signal on the flag-staff at the mizen-top-mast-head, and fires a gun. When he would have them give over chase, he hoists a white flag on his flag-staff at the fore-top-mast-head, and fires a gun; which signal is also to be made by that flag-ship which is nearest the ship that gives chase, till the chasing ship sees the signal. When the admiral would have the fleet prepare to anchor, he hoists an ensign

striped red, blue, and white, on the ensign-staff; and fires a gun; and every flag-ship makes the same signal.

Besides these, there are many other signals used by day; and different signals, upon these and other occasions, used by night: and others also when a fleet sails in a fog; all of which are to be found in the Book of Signals.

The signals for managing a sea-fight are also very numerous, the principal of which are as follow: when the admiral would have the fleet form a line of battle, one ship a-head of another, he hoists an union flag at the mizen-peek, and fires a gun; and every flag-ship does the like. But when they are to form a line of battle one abreast of another, he hoists a pendant with the union-flag, &c. When he would have the admiral of the white, or he that commands in the second post, to tack, and endeavour to gain the wind of the enemy, he spreads a white flag under the flag at the main-top-mast-head, and fires a gun: and when he would have the admiral of the blue do so, he does the same with the blue flag. If he would have the vice-admiral of the red do so, he spreads a red flag from the cap, on the main-top-mast-head downward on the back-stay; if the vice-admiral of the blue, he spreads a blue flag, and fires a gun: if he would have the rear-admiral of the red do so, he hoists a red flag at the flag-staff at the mizen-top-mast-head; if the rear-admiral of the white, a white flag; if the rear-admiral of the blue, a blue flag, and under it a pendant of the same colour, with a gun. If he would have him that commands in the second post of his squadron to make more sail, he hoists a white flag on the ensign-staff; but if he that commands in the third post be to do so, he hoists a blue flag and fires a gun; and all the flag-ships must make the same signal. Whenever he hoists a red flag on the flag-staff at the fore-top-mast-head, and fires a gun, every ship in the fleet must use their utmost endeavour to engage the enemy in the order prescribed. When he hoists a white flag on his mizen-peek, and fires a gun, all the small frigates of his squadron, that are not of the line of battle, are to come under the stern. If the fleet be sailing by a wind in the line of battle, and the admiral would have them brace their head-sails to the mast, he hoists up a yellow-flag on the flag-staff at the mizen-top-mast-head, and fires a gun, which the flag-ships are to answer, and then the ships in the rear are to brace first. After this, if he would have them fall their head-sails, and stand on, he hoists a yellow flag on the flag-staff of the fore-top-mast-head, and fires a gun, which the flag-ship must answer; and then the ships in the van must fall first, and stand on. If, when this signal is made, the red-flag at the fore-top-mast-head be abroad, he spreads the yellow flag under the red-flag. If the fleets being near one another, the admiral would have all the ships to tack together, the sooner to lie in a posture to engage the enemy, he hoists an union flag on the flag-staves at the fore and mizen-top-mast-heads, and fires a gun; and all the flag-ships are to do the same. The fleet being in a line of battle, if he would have the ship that leads the van hoist, lower, set, or hawl-up any of his sails, he spreads a yellow flag under that at his main-top-mast-head and fires a gun; which signal the flag-ships are to answer: and the admiral will hoist, lower, set, or hawl-up the sail, which he would have the ships that lead the van do; which is to be answered by the flag-ships of the fleet. When the enemies run, and he would have the whole fleet follow them, he makes all the sail he can after them himself, takes down the signal for the line of battle, and fires two guns out of his fore-chase, which the flag-ships answer: and then every ship is to endeavour to come up with, and board the enemy. When he would have the chase given over, he hoists a white flag at the fore-top-mast-head, and fires a gun. If he would have the red squadron draw into a line of battle, one abreast of another, he puts abroad a flag striped red and white on the flag-staff at the main-top-mast-head, with a pendant under it, and fires a gun: if the white or second squadron is to do so, the flag is striped red, white, and blue; if the blue or third squadron is to do so, the flag is a Genoese ensign and pendant: but if they are to draw into a line of battle one a-head of another, the same signals are made without a pendant. If they are to draw into the line of battle one a-stern of another, with a large wind, and he would have the leaders go with the starboard-tacks aboard by the wind, he hoists a red and white flag at the mizen-peek, and fires a gun: but if they should go by the larboard-tacks aboard the wind, he hoists a Genoese flag at the same place: which signals, like others, must be answered by the flag-ships.

SIGNALS (Day), are usually made by flags and pendants, sometimes accompanied with one or more guns; and night signals are either lanterns disposed in certain figures, as lines, squares, and triangles, or are made with false fires. Fog-signals consist of operations which emit sound, as firing cannon or muskets, beating drums, &c.

SIGNALS, in military actions. In former times large pieces of wood were hung above the towers of cities or castles, which, by being drawn up or lowered, gave intelligence of what passed. This method has been succeeded by the invention of telegraphs, which answer every purpose of communication, when they can be established through any extent of country. Besides those signals, there are others which may be called vocal and demi-vocal. The vocal signals are those of the human voice, which consists in the necessary precautions that are adopted to prevent a guard or post from being surprised, to enounce words of command in action, &c. Of the first description are paroles and countersigns, which are exchanged between those to whom they are intrusted, and which are frequently

altered, during the day and night, to prevent the enemy from receiving any information by means of spies. The demi-vocal signals are conveyed by military instruments; the different soundings of which indicate, instantaneously, whether an army is to halt or to advance, whether troops are to continue in the pursuit of an enemy, or to retreat.

The demi-vocal signals, directed to be observed in the British service, as far as regards the manœuvring of corps, &c. consist of signals for the government of light infantry, and of cavalry regiments, squadrons, or troops: the latter are properly called soundings. Light infantry signals are to give notice to advance, to retreat, to halt, to cease firing, to assemble, or call in all parties. In the regulations printed by authority it is observed, that these signals are to be always considered as fixed and determined ones, and are never to be changed. The bugle horn of each company is to make himself perfect master of them. All signals are to be repeated; and all those signals which are made from the line or column are to convey the intention of the commanding officer of the line to the officer commanding the light infantry, who will communicate them to the several companies or detachments either by word or signal.

Besides these there are signals by beat of drum, as a short roll, a flam, to arms, two short rolls, the troop, the long roll, &c. which, of course, indicate different series of operations, varying with the kind of service in which they are employed.

SIGNA'LITY. *s.* (from *signal.*) Quality of something remarkable or memorable.

To SI'GNALIZE. *v. a.* (*signaler*, Fr.) To make eminent; to make remarkable (*Swift*).

SI'GNALLY. *ad.* (from *signal.*) Eminently; remarkably; memorably (*South*).

SIGNATION. *s.* (from *signo*, Latin.) Sign given; act of betokening (*Brown*).

SI'GNATURE. *s.* (*signature*, French.) 1. A sign or mark impressed upon any thing; a stamp; a mark (*Watts*). 2. A mark upon any matter, particularly upon plants, by which their nature or medicinal use is pointed out (*More*). 3. Proof drawn from marks (*Rogers*).

SIGNATURE, in printing, is a letter put at the bottom of the first page at least, in each sheet, as a direction to the binder, in folding, gathering, and collating them. The signatures consist of the capital letters of the alphabet, which change in every sheet: if there be more sheets than letters in the alphabet, to the capital letter is added a small one of the same sort, as A a, B b; which are repeated as often as necessary. In large volumes it is usual to distinguish the number of alphabets after the first two by placing a figure before the signature, as 3 B, 4 B, &c.

SI'GNATURIST. *s.* (from *signature.*) One who holds the doctrine of signatures (*Brown*).

SI'GNER. *s.* (from *sign.*) One that signs.

SI'GNET. *s.* (*signette*, Fr.) A seal commonly used for the seal manual of a king

SIGNI'FICANCE. SIGNI'FICANCY. *s.* (from *signify.*) 1. Power of signifying; meaning (*Stilling.*). 2. Force; energy; power of impressing the mind (*Swift*). 3. Importance; moment; consequence (*Add.*).

SIGNI'FICANT. *a.* (*significant*, Fr. *significans*, Latin.) 1. Expressive of something beyond the external mark (*Shakspeare*). 2. Betokening; standing as a sign of something (*Raleigh*). 3. Expressive or representative in an eminent degree; forcible to impress the intended meaning (*Hooker*). 4. Important; momentous.

SIGNI'FICANTLY. *ad.* (from *significant.*) With force of expression (*South*).

SIGNIFICA'TION. *s.* (*signification*, Fr. *significatio*, Latin.) 1. The act of making known by signs (*South*). 2. Meaning expressed by a sign or word (*Holder*).

SIGNI'FICATIVE. *a.* (*significatif*, Fr.) 1. Betokening by an external sign (*Brerew.*). 2. Forcible; strongly expressive (*Camden*).

SIGNI'FICATORY. *s.* (from *signify.*) That which signifies or betokens (*Taylor*).

To SI'GNIFY. *v. a.* (*signifier*, French; *significo*, Latin.) 1. To declare by some token or sign (*Dryden*). 2. To mean; to express (*Shakspeare*). 3. To import; to weigh (*Taylor*). 4. To make known; to declare (*Swift*).

To SI'GNIFY. *v. n.* To express meaning with force (*Ben Jonson*).

SI'GNIORY. *s.* (*seignoria*, Italian.) Lordship; dominion (*Daniel*).

SI'GNPOST. *s.* (*sign* and *post.*) That upon which a sign hangs (*Ben Jonson*).

SIGUENZA, a town of Spain, in New Castile, and a bishop's see, with a university, and a castle, in which is an arsenal. The university consists of several colleges; but the most considerable structure is the cathedral. It is seated on a hill, at the foot of Mount Atienca, 65 miles N.E. of Madrid. Lon. 2. 51 W. Lat. 40. 58 N.

SIGUETTE, in the manage, a cavesson with teeth or notches; that is, a semicircle of hollow and vaulted iron, with teeth like a saw, consisting of two or three pieces joined with hinges, and mounted with a head-stall. There is a sort of siguette that consists of a round iron, all of one piece, sewed under the nose-band of the bridle, that it may not be in view.

SI'KER. *a.* and *ad.* The old word for *sure* or *surely*. See SICKER (*Spenser*).

SI'KERNESS. *s.* (from *siker.*) Sureness; safety.

SILAGUTTA, a town of Hindustan, in Mysore, celebrated for its kitchen-gardens. Coarse cotton cloths are made here, and some tobacco grows in the neighbourhood It is 20 miles N.W. of Colar, and 32 N.E of Bangalore.

SILBERBERG, a strong town of Silesia, enclosed in the principality of Munsterberg,

but belonging to that of Brieg. It has a mine which yields lead ore mixed with silver, and is 11 miles N.N.E. of Glatz.

SILCHESTER, a village in Hampshire, six miles N. of Basingstoke. It was once a celebrated city, and is said to have been the place where Arthur was crowned. There are considerable remains of its walls and ditches, enclosing an area of 80 acres; and two military roads from the S. gate, one to Winchester, and the other to Old Sarum.

SI'LENCE. *s.* (*silence*, Fr. *silentium*, Lat.) 1. The state of holding peace; forbearance of speech (*Milton*). 2. Habitual taciturnity; not loquacity (*Shak.*). 3. Secrecy. 4. Stillness; not noise (*Pope*). 5. Not mention; oblivion (*Milton*).

SI'LENCE. *interj.* An authoritative restraint of speech (*Shakspeare*).

To SI'LENCE. *v. a.* (from the noun.) 1. To oblige to hold peace; to forbid to speak (*Clarendon*). 2. To still (*Waller*).

SILENE. Catchfly. In botany, a genus of the class decandria, order trigynia. Calyx one-leafed, swelling; petals five, with claws; capsule superior, imperfectly three-celled, bursting at top, many-seeded.

Seventy-two species, thus subdivided:

A. Petals crowned at the throat; flowers solitary, lateral.

B. Petals crowned at the throat; flowers lateral, clustered.

C. Corol crowned; flowers from the fork of the stem.

D. Corol crowned; flowers terminal.

The following are the cultivated species:

1. S. armeria. Common or Lobel's catchfly. It is found wild on the old walls of our own country; very glutinous an inch below each joint: the flowers in terminal bunches, erect, and forming a kind of umbel.

2. S. quinquevulnera. Variegated catchfly. Stalks a little viscid; petals with a deep red spot in their centre like a drop of blood; a native of the south of Europe.

3. S. pendula. Pendulous catchfly. An annual plant; flowers axillary, upon short peduncles, single, large, bright red, resembling the wild red campion: a native of Crete.

4. S. muscipula. Spanish catchfly. Root biennial; stalk extremely viscid; flowers axillary, bright red: a native of the south of France.

5. S. undiflora. Green-flowered catchfly. Biennial root; stem smooth; flowers in loose spikes, of a green colour: a native of Spain.

6. S. nutans. Nottingham catchfly. Woody perennial root; flowers drooping, white, of a delicate texture: a native of several parts of Europe; and indigenous to our own country.

7. S. fruticosa. Shrubby catchfly. Stem low, shrubby, dividing into short branches; flowers herbaceous, white: a native of Sicily.

The annual and biennial sorts may be raised by seeds; the shrub by slips or cuttings.

SI'LENT. *a.* (*silens*, Latin.) 1. Not speaking; mute (*Psalms*). 2. Not talkative; not loquacious (*Broome*). 3. Still; having no noise (*Milton*). 4. Wanting efficacy (*Raleigh*). 5. Not mentioning (*Milton*).

SI'LENTLY. *ad.* (from *silent.*) 1. Without speech (*Dryden*). 2. Without noise (*Dryden*). 3. Without mention (*Locke*).

SILENUS, a demi-god, who became the nurse, the preceptor, and attendant of the god Bacchus. He was, as some suppose, son of Pan, or according to others, of Mercury, or of Terra. Malea, in Lesbos, was the place of his birth. After death he received divine honours, and had a temple in Elis. Silenus is generally represented as a fat and jolly old man, riding on an ass, crowned with flowers, and always intoxicated. Some authors assert, that Silenus was a philosopher, who accompanied Bacchus in his Indian expedition. From this circumstance, therefore, he is often introduced speaking with all the gravity of a philosopher concerning the formation of the world, and the nature of things. The Fauns in general, and the Satyrs, are often called Sileni.

SILESIA, a duchy of Germany, formerly belonging to the kingdom of Bohemia. It is 200 miles long and 170 broad; bounded on the N. by Brandenburg, E. by Poland, S. by Moravia, and W. by Bohemia and Lusatia. The principal rivers are, the Oder, Bober, Neisse, Queis, and Oppa. A long chain of mountains bound Silesia on the W.; and the highest mountain, called Zotenberg, is in the principality of Schweidnitz. There are mines of coal, lead, copper, and iron, and quarries of various stones, besides antimony, saltpetre, sulphur, alum, vitriol, quicksilver, agate, jasper, and even some gems. The principal manufacture is linen cloth; and there are also some woollen manufactures, potteries, iron founderies, and glass-houses. In this country are a great number of cattle, large studs of horses, and plenty of game in the woods; also a few lynxes, bears, foxes, otters and beavers. There are many lakes, full of pike, carp, and other good fish; also plenty of bees, which produce much honey and wax. It affords wheat, maize, barley, oats, and millet, and in some places saffron is cultivated; but its wine is bad, and chiefly turned into vinegar. Silesia is divided into Upper and Lower Silesia, and the county of Glatz. In Upper Silesia, which is the S. part, the inhabitants are generally Roman-catholics, speaking the Polish language; in the Lower, they are almost all Protestants, and speak their mother-tongue. This country was ceded to the king of Prussia, in 1742, by the treaty of Breslaw. In 1807, Silesia was overrun by the French, but at the peace of Tilsit was restored to Prussia. Breslaw is the capital.

SILESIAN EARTH, in the materia medica, a fine astringent bole. It is very heavy, of a firm compact texture, and in colour of a brownish yellow. It breaks easily between the

fingers, and does not stain the hands; is naturally of a smooth surface, is readily diffusible in water, and melts freely into a butter-like substance in the mouth. It leaves no grittiness between the teeth, and does not ferment with acid menstrua. It is a better astringent than most of the boles in use.

SILEX, or SILESIA, in mineralogy, a species of pyromachus: an earth generally found in a stony state, and chiefly consisting of flint. See PYROMACHUS.

SILICEOUS, a classific term in mineralogy, embracing all those earths that consist chiefly of silex, silica, or pyromachus. See MINERALOGY.

SILICULA. (from *siliqua*.) In botany, a silicule, or silicle silice, little pod or pouch. A two-valved pericarp, having the seeds fixed along both sutures, and the transverse diameter equal, or nearly so, to the longitudinal. This pericarp varies in shape; being orbiculate, ovate, or flatted; entire at the end, or emarginate. Hence

SILICULOSA. The name of the first order in the class tetradynamia.

SILI'CULOSE. *a.* (*silicula*, Lat.) Husky; full of husks.

SILI'GINOSE. *a.* (*siliginosus*, Latin.) Made of fine wheat.

SI'LIQUA. *s.* (Latin.) 1. A carat, of which six make a scruple. 2. The seed-vessel, husk, cod, or shell of such plants as are of the pulse kind.

SILIQUA DULCIS. (*siliqua*, a pod or receptacle for seed, applied to plants which bear pods.) Sweet-pod. The fruit so called is the produce of the ceratonia siliqua of Linnéus. They are about four inches in length, and as thick as one finger, compressed and unequal, and mostly bent; they contain a sweet brown pulp, which is given in form of decoction, as a pectoral in asthmatic complaints and coughs.

SILIQUA HIRSUTA. The cowage is sometimes so called. See DOLICHOS.

SILIQUA'STRUM. (from *siliqua*, a pod; named from its pods.) Judas-tree. The capsicum or guinea pepper was so termed by Pliny. See PIPER INDICUM.

SILIQUOSA. The name of the second order in the class tetradynamia: containing those plants which have a proper siliqua for a pericarp.

SILIQUOSÆ. The name of the fifty-seventh order in Linnéus's fragments; of the thirty-ninth in his natural orders; and of the twentieth class in Ray's method. They are the same with the cruciformes of Tournefort.

C. SILIUS ITALICUS, a Latin poet, who was originally at the bar, where he for some time distinguished himself, till he retired from Rome more particularly to consecrate his time to study. He was consul the year that Nero was murdered. From his great partiality, not only to the memory but to the compositions of the Mantuan poet, he has been called the ape of Virgil. Silius starved himself when labouring under an imposthume which his physicians were unable to remove, in the beginning of Trajan's reign, about the 75th year of his age. There remains a poem of Italicus, on the second Punic war. The poetry is weak and inelegant, yet the author deserves to be commended for his purity, and his interesting descriptions. He has every where imitated Virgil, but with little success.—Caius, a man of consular dignity, greatly loved by Messalina, by whom he was obliged to divorce his wife. Silius was at last put to death for the adulteries which the empress obliged him to commit.

SILK, the fine glossy thread spun by various species of caterpillars, or larves of the phalæna genus. Of these P. atlas gives the greatest quantity, but P. bombyx is that commonly employed for this purpose in Europe. The matter from which the silk is spun is found secreted in two purses, or small intestines of the insect, which being taken out and extended forms the Indian weed so well known to fishermen.

According to Reaumur, the phalæna is not the only insect that affords this material; for he found several species of the aranea or spider which enclosed their eggs in a very fine silk, and afforded a more delicate and yet a stronger thread than that of the common species. Like the silk of the phalæna, this also was of various colours, as white, yellow, sky-blue, grey, and coffee-hue; but the spider silk has not yet undergone any chemical investigation.

There are also some species of testaceous worms that possess a long, silky byssus or beard, which is occasionally used for the same purposes as the silk of the silk-worm, and is of a softer texture.

This is particularly the case with the pinna, or nacre-tribe (see PINNA), which are found in considerable frequency on the coasts of Italy, and whose material is occasionally woven into ornamental dresses.

The silk of commerce, however, is at all times that of the phalæna or silk-worm. This caterpillar, when full grown, encloses itself in a loose web, in the midst of which it forms a much closer case or covering, of an oval form, and varying in colour from white to a deep orange, but usually of a bright yellow colour. In this case, or ball, the animal becomes a chrysalis, and remains enclosed about fifteen days; when having resumed active life, in the form of a moth, it makes a hole at one end of its prison and comes out. This, as it destroys the silk-ball, is prevented in those countries where silk is cultivated, by killing the chrysalides by means of heat. See PHALÆNA.

The silk-worm is supposed to be a native of China, at least the Chinese were the first nation in the world acquainted with the manufacture of silk. It was little known in Europe before the time of Augustus. Galen, who lived about the year 160, mentions silk as in use no where but at Rome, and only among

the rich. The emperor Heliogabalus, who died in the year 220, is said to have been the first man that wore a holosericum, or dress, made wholly of silk; princes, as well as subjects of the greatest quality, wearing only a stuff made of silk mixed with other materials. In the time of Aurelian, silk was sold in Rome for its weight in gold, and long continued to bear a great value, from the expense attending the mode in which it was procured. The only silk then known was that of China, which was brought from thence, in the raw state, to Berytus and Tyre, in Phœnicia, where it was manufactured; but this branch of commerce being interrupted by the conquests of the Scythians, the emperor Justinian became desirous of establishing the culture of silk within his dominions; for which purpose he employed two monks, who had been in India, to procure the eggs of the insect from China. This was accomplished about the year 555; the eggs were hatched at Constantinople, and the breed of the insect being carefully encouraged, raw silk was soon produced in abundance, which was worked up into manufactures at Athens, Thebes, Corinth, and other places. It appears, however, that for many years after the establishment of the culture of silk in Greece, garments of this material continued to be very highly valued; as, about the year 790, Charlemagne sent two silken vests as a present to Offa, king of Mercia. About the year 1130, the silk manufacture had made such progress in the island of Sicily as to excite the jealousy of the Venetians, from its interfering with their importations of silks from Greece.—From Venice and Sicily the silk manufacture spread through Italy, from whence it was introduced into the southern provinces of France.

As soon as the worms have produced their balls, or cocoons, they become an article of trade, for in those countries where silk is cultivated few persons reel off their cocoons, but sell them to others, who make this operation a separate business. The silk, as formed by the worm, is so very fine, that if each ball, or cocoon, was reeled separately, it would be totally unfit for the purposes of the manufacturer; in the reeling, therefore, the ends of several cocoons are joined and reeled together out of warm water, which, softening their natural gum, makes them stick together, so as to form one strong smooth thread. As often as the thread of any single cocoon breaks, or comes to an end, its place is supplied by a new one, so that by continually keeping up the same number, the united thread may be wound to any length: the single threads of the newly added cocoons are not joined by any tie, but simply laid on the main thread, to which they adhere by their gum; and their ends are so fine as not to occasion the least perceptible unevenness in the place where they are laid on. The apparatus for reeling consists merely of a small open kettle of water, under which is a fire to keep it hot, and a reel of a very simple construction. Care should be taken in the operation, that the silk when reeled off may consist of a smooth thread of equal thickness and strength, not flat, but of a round form, having the small threads of which it is composed as equally stretched and firmly united as possible; and that the several rounds, as they lie on the reel, should not be glued together. When the skein is quite dry it is taken off the reel, and a tie is made with some of the refuse silk on that part of the skin where it bore upon the bars of the reel, and another tie on the opposite part of the skein, after which it is doubled into a hank, and usually tied round near each extremity, when it is laid by for use, or sale. In this state, in which all the silk that is brought from India, and a considerable part of what comes from Italy and other parts, arrives, it is called raw silk: the principal part of it is afterwards sent to a mill to be thrown; that is, to have two ends of it doubled and twisted together, by which it is converted into tram, or organzine, according to the fineness of the silk, and the purposes to which it is intended to be applied in the manufacture. See ORGANZINE.

The culture of silk varies but little in different countries; it does not require any great degree of skill, or a great capital: and as it is well known that the silk-worm, with proper care, will breed and thrive very well in England, it is not surprising that attempts should have been made to establish the culture of it in this country. The success of Henry IV. of France, in extending the culture of silk, which before his time had been confined to a few districts of that kingdom, excited in James I. an active zeal for the introduction of it here. With this view, in 1608, he caused a circular letter, of his own writing, to be sent to the lord lieutenant of every county, in which he held forth the example of France as affording ground to hope for equal success here. He likewise observed, that from the experience of many private persons who had bred silk-worms for their pleasure, nothing had appeared to cause a doubt that they may be nourished and reared in England, if provision was made for planting mulberry-trees; and for this purpose, the persons to whom the letter was addressed were directed, at the Quarter Session, or some other public meeting, to persuade and require those of ability to buy and distribute in the county the number of 10,000 mulberry plants, which were to be delivered in London at the rate of three farthings a plant. The king likewise caused printed instructions to be published for planting and propagating the mulberry trees, and for breeding and feeding the worms; and though, at first, most persons were probably averse to such a new undertaking, by the continuance of the royal sanction and support, and the consideration of the great advantages reaped by other European nations from their silk manufactures, many people, in the course of a few years, became very earnest for the propagation of the silk-worm, and of the white mulberry tree for feeding it.

In 1629, Charles I. granted to lord Aston

the keeping of the garden, mulberry trees, and silk-worms, near St. James's; but this royal undertaking soon declined, and the project does not appear to have been renewed, on an extensive scale, till many years after.

In 1718, a patent was granted to John Appletree, esq. for producing raw silk of the growth of England, and for raising a fund for carrying on the same. The capital of the undertaking was divided into shares of 5 *l.* each; a deed of trust was executed and enrolled in Chancery; directors were chosen by the subscribers for managing the affairs of the company; and, Chelsea-Park being thought a proper soil for the purpose, and in a convenient situation, a lease was taken of it for 122 years. Here upwards of 2000 young mulberry trees were soon planted, and extensive edifices were erected for carrying on the work; this number of trees was, however, but a small part of what the company intended to plant, if they were successful.

In 1719, Mr. Henry Barham, who was probably a member of this company, published An Essay upon the Silk-Worm, in which he thinks all objections and difficulties against this glorious undertaking are shown to be mere phantoms and trifles: the event, however, proved that the company met with difficulties of a real and formidable nature; for though the expectation of Mr. Barham, who questioned not that in the ensuing year they should produce a considerable quantity of raw silk, may have been partly accomplished: the violent stock-jobbing speculations of that period, which involved the shares of all projects of this nature, must have produced many changes among the proprietors, and deranged the original design, in consequence of which it soon went to decay. From that time there has been no public undertaking of the kind; but individuals have continued to rear the silk-worm as an object of curiosity, and have generally been successful, as it is easy to bestow a degree of care and attention on a small number, which could not be extended to a large concern. The insurmountable obstacle to raising silk in Great Britain is the climate, which is too cold and wet; and though expedients might be adopted to obviate these inconveniencies, they would render the culture of the article on a large scale by far too expensive.

As the mulberry tree is scarce in some parts of this country, attempts have been made to feed the worms on other plants. Miss Croft of York, in 1792, sent to the Society for the encouragement of Arts, Manufactures, and Commerce, a specimen of silk produced by worms fed entirely upon lettuce leaves. The respectable society just mentioned continue to offer premiums for the production of silk in this country; but as all former attempts, made at a time when land and labour were much cheaper than at present, have turned out unprofitable, and consequently been abandoned, there can be little ground for hope that better success would attend future trials.

King James I. whose zeal for raising silk in this country has been noticed, at the same time, extended his views to the American colonies. He several times urged the Virginia Company to promote the cultivation of mulberry trees, and the breeding of silk-worms, particularly by a letter addressed to them, in 1622, expressly on this subject, in which he charged and required them to see that the people there used all possible diligence in breeding of silk-worms, and erecting of silk-works, and that they bestowed their labour in producing this rich and solid commodity in preference to tobacco, an article to which he had a violent aversion. The company appear to have been determined not to be outdone by the king, in zeal for the accomplishment of this object, and accordingly transmitted his majesty's letter to the governor and council of Virginia, with very particular instructions to employ all their endeavours for establishing the staple commodities of silk and wine; for the better accomplishment of which they sent a number of copies of a book on the subject, written by Mr John Bonoeil, a member of the company, who engaged earnestly in the attempt, and was so fully convinced of its practicability, that he says, such quantities of silk might easily be made in Virginia, if ther were a sufficient number of hands, as in a very short time would serve all Christendom. The misfortunes which the colony of Virginia experienced, and the dissolution of the company soon after, must have checked the execution of this project very materially; and though a considerable number of trees were planted, and were found to flourish, but little silk appears to have been produced.

In 1654, it appeared that the culture of silk had been revived in Virginia, by Mr. Edward Diggs, who was confident that he had conquered all the principal difficulties respecting this commodity, and made its profit so evident to all the Virginians, that in a short time there would be great quantities of silk made. It does not, however, appear that the culture of silk has since been carried to any considerable extent in Virginia, which is probably owing more to the attachment of the planters to the growth of tobacco than to any natural impediment.

The settlement of the colony of Georgia was begun in the year 1732, and the trustees, soon after the commencement of their undertaking, caused a common nursery garden to be laid out for white mulberry trees, for the production of silk. It was at this time raised in Carolina, in small quantities, some families making about forty or fifty pounds weight in the year. In order to instruct the colonists of Georgia upon this subject, some persons from Piedmont in Italy, skilled in tending the worms and the winding of silk, were sent thither; and, notwithstanding the difficulties attending the attempt, and the public misfortunes of the colony, many persons persevered and experienced some success; an act of parliament was in consequence passed, in 1749, for en-

couraging the culture of raw silk in the American colonies, by which raw silk, certified to be the real growth and culture of those colonies, was exempted from any duty on importation into the port of London. The culture increased gradually, though slowly, both in Georgia and the adjoining province of South Carolina; but a few years after the produce became more considerable. In the year 1757, 1,052lbs. weight of silk-balls were received at the filature in Georgia, and the next year produced no less than 7,040lbs. weight thereof. In 1759, there were received at Savannah, the capital of Georgia, considerably above 10,000lbs. weight of raw silk, although it was thought an unfavourable season. As the culture of this valuable article thus appeared to be making some progress in the southern colonies, an act of parliament was passed, in 1769, for the further encouragement of the growth of raw silk in America; by which a bounty was granted of 25*l*. for every 100*l*. value of such raw silk for the next seven years, and lesser bounties during the two following periods of seven years. The Society for the encouragement of Arts, Manufactures, and Commerce, also offered large premiums for encouraging the same object; but still the quantities raised were but small, and the cost too great for competition with silk from other parts.

There can be no doubt that in many parts of the southern states of America the climate is as favourable to the mulberry tree and the silk-worm, as in those countries in Europe where they are raised; the chief difficulty the Americans have to contend with respecting this article is, that in most of the southern states, the labourers are Negro slaves, who are not sufficiently attentive and skilful in this business.—In Connecticut, where there is a sensible and careful white population, and where land is comparatively scarce and dear, the culture of silk has been found to be practicable and profitable. A project to extend the white mulberry tree over all the States was formed a few years ago, in consequence of which a considerable number were planted. An extensive nursery of these trees was established near Philadelphia, in 1789; another at Princeton, in New Jersey; and two more in New York, and Long Islands. The idea upon which these nurseries were principally encouraged was, that they prepared the States for the reception of emigrants from silk countries; but no considerable emigration from those countries has taken place.

In the British settlements in the East Indies, the culture of silk has been long established, particularly in the island of Cossimbwzar and its neighbourhood, in the province of Bengal; and since, about the year 1760, when the company became the rulers of the country, and adopted a new system of trade for the purpose of realizing the surplus revenue, the culture of raw silk has been promoted, and the quantity considerably increased. Of late years, considerable attention has been paid both to the quality of the silk, and to the mode of reeling it, by which it has been very materially improved, so as to rival, in most respects, the produce of Italy.

There are eight principal silk factories belonging to the company in Bengal; and in every filature, or factory, there are employed, according to its size, from three thousand to ten thousand people; and if to these are added the mulberry-planters, worm-feeders, &c. from ten thousand to forty thousand men, women, and children, are attached to each filature. Attempts have been made to introduce the silk-worm in other parts of the company's possessions, especially on the coast of Coromandel. Dr. James Anderson, of Fort St. George, who has been particularly zealous in promoting this among other useful undertakings, introduced mulberry trees at Madras, about the year 1770, and finding they grew luxuriantly, afterward endeavoured to procure silk-worms' eggs from Bengal: his two first attempts were unsuccessful, but the third in 1789 succeeded, and the advantages likely to accrue from the culture of silk soon engaged several persons on different parts of the coasts in breeding the worms. In a letter to sir Joseph Banks, dated 26th January, 1792, he says, "I have received accounts of the success of the silk-worms at Palamcotta and Masulipatam, as well as of the recovery of those that had been diseased by the late rains at Tritchinopoly; so that a breed of this insect is already established in an extent of six hundred miles upon the coast, but it will rest with the company to render it productive."

The establishment of the silk manufactory in Great Britain affords one of the most complete instances in which an art borrowed entirely from other nations, and employed on a material entirely of foreign growth, has been brought to such perfection in this country, as to equal, and in some instances to surpass, the productions of those countries from which it was derived. The use of silk was introduced into this country gradually, being at first confined to small ornamental articles. In the year 1455 there appears to have been a company of silk-women in England, who most probably only used silk in embroidering and other kinds of needle-work, but their performances at least contributed to bring this elegant material into more general notice. By an act of Henry VII, entitled Silk-work, it appears that about 1504, the smaller manufactures of silk were executed in England, as it was among other things enacted, that from thenceforth no person should import into England for sale any kind of silk wrought by itself or with any other material in any place out of the realm, in ribbands, laces, or girdles; but none of the more important branches of the manufacture could then have existed here, or such goods would certainly have been included in the prohibition. The king sometimes obtained a pair of silk stockings, which were brought from Spain, the making of silk hose not having yet been attempted in

England; it was, however, introduced about the year 1561, when queen Elizabeth was presented with a pair of black silk knit stockings, and is said to have been so pleased with them, that she never wore cloth hose after. Elizabeth's fondness of dress must have inclined her to countenance every branch of this manufacture; but little was done for its improvement till the reign of her successor, whose active measures for establishing the culture of silk, and increasing the importance of the manufacture in this country, were by no means fruitless. The broad-silk manufacture was introduced here about the year 1620; and a Mr. Burlamach, a merchant much employed by the king, by his direction brought from abroad silk throwsters, dyers, and broad weavers; whose assistance so materially contributed to the improvement and increase of the manufacture, that in 1630 it was thought proper to incorporate the silk throwsters of London, and within four miles thereof; and in the following year the silk-men were likewise incorporated: the weavers had been incorporated long before. In addition to these favours from Charles I. he endeavoured to protect the trade from what appeared to be an improper practice, by issuing a proclamation respecting the increase of weight of silk dyed black upon the gum, which was then considered as a great fraud, and prohibited accordingly; but upon better information the king thought proper, in 1638, to revoke this prohibition. About the same time a new charter was granted to the weavers' company, and by a proclamation issued soon after, they were empowered to admit into the freedom of their company a competent number of such persons, as well strangers as natives, as had exercised the trade of weaving at least one whole year, before the date of the new charter, "who shall be conformable to the laws of the realm, and the constitutions of the Church of England." It has been justly asked, What had the constitution of any church to do with the trade of weaving? What other political qualification could be requisite but that the weaver should be a peaceable subject, and, considering the times, a protestant of some denomination or other? But many similar instances may be found, in which bigotry and party zeal imposed injudicious restrictions on trade and manufactures.

In 1661 the silk throwsters petitioned parliament, in order to obtain the legislative sanction to some regulations that were thought necessary for the security of their trade, which they asserted employed above forty thousand men, women, and children; and, in consequence of this application, the privileges of the company were extended to twenty miles round London, and it was enacted that none should set up the trade of a silk-throwster, but such as had served seven years apprenticeship to it, and should make themselves free of the company.

In 1680 the Weavers' company petitioned the House of Commons against the importa- of foreign silks from France, and the wear of East India wrought silks, which had then become very general; but it does not appear that any thing was done in consequence of this application. The Turkey company about the same time renewed a complaint they had before made at different times against the East India company for importing raw silk; this article having formerly been wholly imported from Turkey, and being a valuable branch of the commerce of that company, which they were now rapidly losing, it induced them soon after to make a formal complaint to the Privy Council; on which occasion, among other assertions, they denominated the new silk which had been imported from Bengal, "a deceitful sort of raw silk." The India company, unable wholly to deny this charge, contented themselves with saying, that, with respect to the quality of Bengal silk, it was like all other commodities, good, bad, and indifferent; and rested their defence chiefly on the more general ground of the importance of the manufacture, and the propriety of encouraging it, asserting that raw silk had become so essential, that it might be compared with sheeps' wool and cotton wool; and that since their importation thereof, the silk manufacture had increased in the proportion of one to four. This contest between the two companies for the importation of raw silk, proves that it was a valuable branch of trade; and it appears that the manufacture was increasing rapidly; but nothing contributed so much to its full establishment in this country as the cruel persecution of the protestant christians in France, on the revocation of the edict of Nantes, in 1685. Of the multitudes who fled at that period, upwards of fifty thousand took refuge in England, the greater part of whom settled in the suburbs of London; those who had been engaged in silk-weaving chiefly fixed their residence in Spitalfields, where they added to the branches of this art already known, those of modes and lustrings, which articles had hitherto been imported from France; they also instructed our weavers in brocades, satins, mantuas, and velvets. Soon after the revolution, in consequence of the war, an act was passed prohibiting all trade and commerce with France, a measure which must have co-operated very materially with the arrival of the new workmen to the success of the silk trade in this country, as the annual importation of French silks had been very great for some years before. In 1692, lustrings and modes being much in fashion, and the fabrication of them but recently introduced here, the makers for their encouragement had a patent granted them, and soon brought this branch to the greatest perfection: upon which, about five years after, foreign lustrings and modes were entirely prohibited, and the sole privilege of making these silks confirmed to the company by act of parliament, for the term of fourteen years; but with the change of fashion this company came to nothing. In 1697 the weavers of London became very tumultuous, on account of the great quantities of silks, stained calicoes, and other

Persian and Indian manufactures imported by the East India company, and worn by all sorts of people.

To remedy these complaints, a bill was brought into parliament to restrain the wearing of these foreign goods, and the House of Lords heard council and witnesses for and against it: the India company on this occasion engaged the celebrated Dr. Davenant to write in their defence, who in his Essay on the East India Trade, asserted that since the goods imported by the company had been in use, the price of silks from France, Spain, and Italy, had fallen at least twenty-five per cent.; and endeavoured to show that the intended prohibition would be destructive to the India trade in general, and hazard its being utterly lost to this country. The contention between the old and new East India companies greatly increased the importation of India wrought silks and calicoes, and the wear of them became universal till prohibited by an act of parliament passed in 1700.

In 1713, the Weavers' company, alarmed at the tendency of a treaty of commerce which had been concluded with France, under which the general introduction of French silks would soon have ruined the English manufacture, petitioned parliament against the bill for rendering effectual the eighth and ninth articles of the treaty, and in their petition they represent the state of the manufacture at that period in the following words: "That by the encouragement of the crown, and of divers acts of parliament, the silk manufacture is come to be above twenty times as great as it was in the year 1664; and that all sorts of as good black and coloured silks, gold and silver stuffs and ribbons, are now made here as in France. That black silk for hoods and scarfs, not made here above twenty-five years ago, hath amounted annually to above three hundred thousand pounds for several years past, which before were imported from France, &c." As not only persons concerned in the silk trade, but most other manufacturers and merchants, were against the articles of the treaty which caused this petition, the bill was rejected by the House of Commons, to the great joy of the drapers, mercers, and weavers of London, who expressed their satisfaction at the event by bonfires and illuminations.

A few years after, the art of throwing fine raw silk into organzine was introduced into this country by Messrs. Thomas and John Lambe; but some impediments arising to the success of the undertaking, their machinery was afterwards applied to throwing train and singles.

The decline of the Turkey trade being attributed at this period to the French exporting woollens to Turkey and taking raw silks in return, which were afterwards brought from Italy into this country, an act was past prohibiting the importation of raw silk the produce of Asia, from any ports in the Straits or Levant seas, except such ports and places as are within the dominions of the grand seignior. It was also thought proper to pass an act for encouraging the consumption of raw silk, by rendering more effectual a former act respecting the trifling articles of buttons and button-holes. In 1721, a much more important act was passed, allowing drawbacks on different descriptions of manufactured silk goods, when exported. In 1750, an act was passed for reducing the duties then payable on the importation of China raw silk to the same duty as was payable on raw silk imported from Italy, which was certainly an advantage to the manufacture, China silk being of a quality peculiarly adapted to several purposes, particularly to the gauze branch, which at one time consumed a large proportion of it, though it has since been inconsiderable. By the act just mentioned the East India company were enabled to increase with advantage their import of silk, which at that time was not very considerable, raw silk being still principally brought from Turkey.

Total quantity of raw silk imported into Great Britain in the year 1750.

From Flanders . . .	1,407lbs.
Spain and Portugal	2,564
Streights . . .	14,897
Italy	36,301
Turkey	132,894
East Indies . . .	43,876
	231,939

In 1763 an act was passed for rendering more effectual the act of 19 Henry VII. by imposing fines on the importers or venders of the articles therein prohibited, in addition to the forfeiture of the goods. This measure, though it might in some degree check the introduction of foreign articles, was by no means adequate to the object it had in view, as the importation still continued, which from the jealousy and discontent it excited among the workmen in this manufacture, appeared likely, in the beginning of the year 1765, to be attended with serious consequences. The journeymen weavers and others connected with the trade, who conceived themselves injured by the common use of French silks, assembled in Spitalfields and Moorfields by beat of drum, in order to petition parliament for redress by a total prohibition of such articles, and from thence proceeded in different bodies to St. James's and Westminster Hall. This disposition, and the report that the weavers in the inland towns were coming to London to join their distressed brethren, excited considerable alarm; they were, however, prevented from committing any great outrage, and finally appeased by a seasonable subscription for their relief, and an association among the principal mercers to recal all the orders they had given for foreign manufactures. An act was also passed prohibiting the importation of foreign manufactured silk stockings and gloves into Great Britain and the British dominions, and for rendering more effectual the act passed in 1763 for prohibiting other articles. For the encouragement of the throwing part of this manufac-

ture, an act was likewise passed in 1765, for reducing the duties then payable on the importation of raw silk, for allowing a drawback on the exportation of raw and thrown silk to Ireland, and for prohibiting the exportation of raw silk from Ireland. In the next year, an act was passed to prohibit the importation of foreign manufactured silks and velvets, and for preventing unlawful combinations of workmen employed in the silk manufacture; the preamble to the act stated, that great quantities of foreign wrought silks and velvets were daily brought into and sold in Great Britain. By another act a heavy additional duty was imposed on Italian silk-crapes and tiffanies, imported into this country.

Towards the end of the year 1767, it was determined that all future court mournings should be shortened to one half of the time, which had been usually observed. This was considered particularly beneficial to the silk manufacture, and the Weavers' company presented an address to his majesty on the occasion, in which they assured him that his benevolent resolution would "greatly promote the silk manufactures of this kingdom, give great spirit to the trade, tend to the improvement of it in many branches, and be the means of giving constant employment to the workmen, many of whom, owing to the late mournings, have been out of employ, and in want of bread." They also expressed their obligations to the queen and the rest of the royal family, for their patronage and encouragement of the silk manufacture. An address was likewise presented on the same occasion, signed by all the principal merchants, manufacturers, and others connected with the silk trade.

The journeymen weavers, probably supposing, that by their combination and riotous proceedings a few years before, they had obtained the exclusion of foreign silks, now adopted the same mode for obtaining an advance in the prices paid for workmanship, which being resisted by their employers, the men proceeded to the most disgraceful acts of violence and atrocity, associating together under the name of cutters, and going about in parties at night, disguised and armed with pistols, cutlasses, and other weapons; breaking into the houses of those workmen who did not join them, but followed their employ as usual, and cutting to pieces and destroying all the silk they found in the looms of such workmen. The value of the silks thus destroyed was very considerable; and, in some instances, they ill-treated or murdered those whom they found at work. Several were brought to justice; but it was a considerable time before this lawless disposition entirely subsided. In a dispute between masters and workmen, respecting pay, the opposite interests of the parties must always render it difficult to come to an amicable adjustment, and after various attempts in this instance, an act was passed in 1773 to authorise the magistrates of the cities of London and Westminster, the county of Middlesex, and the liberty of the Tower, to settle the pay of the workmen in the different branches of this manufacture, in their respective districts.

On the extension of the war in 1779, much inconvenience was experienced from the want of a sufficient supply of Italian thrown silk, caused in a great measure by an act of 2 William and Mary, by which the importation of Italian thrown silk was prohibited, unless imported according to the Navigation Act, and directly by sea from some of the ports of the country of its growth or production: this regulation was therefore now suspended, and organzine silk, of the growth or production of Italy, was permitted to be imported from any port or place, or in any ships or vessels whatsoever. In consequence of this permission, the silks of Italy were brought to England by a circuitous route over land, and imported from Ostend and other ports of Flanders, till the peace. At a period of the war when the falling off of the silk trade was very considerable, Mr. John Callaway, of Canterbury, fortunately introduced a new article, which afforded employment to many hands. It was called Canterbury muslin, by which name it is still known, and many elegant varieties having been produced, it gives employment to many hundred persons in London and elsewhere.

As the prohibition of the importation of foreign manufactured silks did not extend to Italian crapes and tiffanies, which were permitted to be imported under a heavy duty, it was thought proper, in 1794, in consequence of improvements in the manufacture of these articles, to restrict this permission, by prohibiting the importation of silk crapes and tiffanies, of the manufacture of Italy, unless brought directly from thence, and by discontinuing the allowance of drawback on exportation.

The continual frauds committed by the different classes of persons employed in this manufacture, by purloining part of the silk entrusted to them, and resorting to various expedients for increasing the weight of the remainder, which frequently rendered the part stolen but a small part of their employers' loss; and the difficulty of convicting the persons who encouraged these practises by purchasing the stolen silk, caused an act to be passed in 1798, by which persons buying or receiving, in any manner, silk, from those employed to work it up, knowing them to be so employed, and not having the consent of the employer, are liable to punishment by fine, imprisonment, or whipping, although no proof should be given upon the trial, to whom the silk actually belonged.

In the year 1793, this manufacture was affected more, perhaps, than any other, by the general commercial distress which then prevailed. The merchants, and particularly the East India company, had large quantities of silk in their warehouses, and the manufacturers were over-stocked with goods, which brought the trade into a state of almost complete stagnation, by which most of the workmen engaged in it were thrown out of employ, and experienced great distress. A public subscription was opened for their relief, and very liberally

supported, from which the unemployed workmen and their families were supplied with bread, and when, from the approach of winter, their necessities increased, the relief was extended to other essential articles. By the report of the committee who superintended the distribution, it appeared that there were given away 795 chaldrons of coals, 583 pair of blankets, and in bread, 121,741 quartern loaves. It was considered as a moderate computation, that 5,000 persons were totally unemployed, and that 5,000 more were only about half employed.

In the course of the succeeding three or four years, the manufacture recovered its usual activity, and in the year 1798 was in a more flourishing situation than it had been in for several years previous. In the following year, the revival of velvets, as an article of female dress, proved very favourable to the workmen, as it rendered the employment of a greater number of hands necessary; and in 1800, few persons in this line were out of employ, although the trade was somewhat checked by a considerable advance in the prices of raw and thrown silks.

Total quantity of Silk imported into Great Britain.

	Bengal Raw.	China Raw.	Italian and Turkey Raw.	Thrown Silk.	Total.
In 1801	351,825 *lbs.*	131,335 *lbs.*	255,951 *lbs.*	275,149 *lbs.*	1,014,260 *lbs.*
1802	111,737	75,588	372,404	396,210	955,939
1803	405,631	74,538	323,630	384,764	1,188,563
1804	624,878	90,362	317,141	449,182	1,481,563
1805	844,659	72,041	267,850	433,272	1,617,822

The annual quantity imported, on an average of the above years, is 1,251,629 pounds, from which, deducting 79,206 pounds, the average quantity of raw and thrown silk exported during the above period, it leaves 1,172,423 pounds for the quantity consumed in the manufacture. Hence it appears, that the total annual value of this manufacture must be about 3,500,000*l.* of which but a small proportion is destined for exportation, the total annual value exported being about 700,000*l.*; more than half of which goes to America. During the year 1808, the exportation to America was suspended, and at the same time, the interruption of commercial intercourse with the continent of Europe stopped, for a considerable time, the usual supply of silk from Italy; from which circumstances, the manufacture was brought into a very unprecedented situation; silk being sold in London at prices far greater than had ever been given before, while many of the masters were obliged to discharge the principal part of their workmen, from the demand for silk goods having, for a time, almost entirely ceased. These temporary embarrassments all manufacturers are liable to, particularly such as, like this, depend on other countries for their materials.

SILK, in chemistry, in its natural state, contains a kind of yellow, resinous matter, which gives it its golden colour. When raw silk is infused in water, a portion of gummy matter is dissolved, and a light amber-coloured liquor is produced. Alcohol extracts a much deeper yellow, and makes a tincture that loses none of its colour by long exposure to the sun-beams, which bleaches the silk itself. Nitrous acid acts powerfully on silk; but, when concentrated nitric acid is distilled off silk, and the remaining liquor duly evaporated, much oxalic acid is obtained, and the residue, if evaporated still further, yields, with the remaining oxalic acid, a quantity of yellow, granular crystals, extremely bitter, not acid, and staining the saliva and hands of a deep yellow, not easily removed. If the liquor is previously saturated with potash, and evaporated, another yellow silky salt separates, which detonates on coals like common nitre, and appears to be a triple combination of the former bitter substance with nitrat of potash.

From the gummy or viscid material which silk gives out to water when infused in it, Chappe found that he was able to blow up the water into bubbles or small balloons, far more permanent than those of soap and water, and offering all the colours of the rainbow. So close, indeed, is the texture of these silky bladders, that even the most subtile gass could not penetrate them. Chappe filled many of them, the diameter of each not exceeding three inches, with hydrogen gass, and found several of them continued in a state of suspension in an apartment for considerably more than twenty-four hours. It is not all silk, however, that is sufficiently glutinous for this purpose. To obtain the effect completely it should be mixed with the water before it is spun, and as soon as it is taken from the caterpillar. Silk of a very deep yellow will not answer the same purpose, for this, from its colour, is supposed to be produced by the worm in a peculiar state of disease, yet a state by no means uncommon.

According to Westrum, silk and wool, when treated with dephlogisticated muriatic acid gass (chlorine), or when diluted with water, instead of being bleached like cottons and linens, always becomes of a yellow colour, and loses a part of its solidity.

The caustic alkalies corrode and dissolve it. On being exposed to heat it gives by distillation the same results as the animal substances. According to Neumann few materials afforded him so much volatile alkali; and Tournefort observes that it contains more than hartshorn: from fifteen ounces of silk he obtained two drams of volatile salt.

SILK COTTON TREE. See BOMBAX.

SILK (Virgin). See PERIPLOCA.

SILK-WORM. See BOMBYX and PHALÆNA.

SILK-WORM (Acid of). See BOMBIC ACID.

SI'LKEN. *a.* (from *silk.*) 1. Made of silk (*Milton*). 2. Soft; tender (*Dryden*). 3. Dressed in silk (*Shakspeare*).

SILKME'RCER. *s.* (*silk* and *mercer.*) A dealer in silk.

SILKWEA'VER. *s.* (*silk* and *weaver.*) One whose trade is to weave silken stuffs.

SI'LKY. *a.* (from *silk.*) 1. Made of silk. 2. Soft; pliant (*Shakspeare*).

SILL. *s.* (ꝑyl, Saxon; *sulle*, Dutch.) The timber or stone at the foot of the door (*Swift*).

SI'LLABUB. *s.* Curds made by milking upon vinegar or wine (*Wotton*).

SILLEBAR, a seaport on the W. coast of Sumatra, a little S. of Bencoolen. Lon. 101. 0 E. Lat. 4. 0 S.

SILLE-LE-GUILLAUME, a commercial town of France, in the department of Sarte, 20 miles N.E. of Mans.

SI'LLILY. *ad.* (from *silly.*) In a silly manner; simply; foolishly (*Dryden*).

SI'LLINESS. *s.* (from *silly.*) Simplicity; weakness; harmless folly (*L'Estrange*).

SI'LLY. *a.* (*selig*, German. *Skinner.*) 1. Harmless; innocent; inoffensive; plain; artless. 2. Weak; helpless (*Spenser*). 3. Foolish; witless (*Watts*).

SI'LLYHOW. *s.* (ꝑelıȝ, happy, and heoꝛt, the head.) The membrane that covers the head of the fetus (*Brown*).

SILPHA. Carrion-beetle. In zoology, a genus of the class insecta, order coleoptera. Antennas clavate, the club perfoliate; shells margined; head prominent; thorax somewhat flattened, margined. A hundred and twenty-three species, scattered over the globe; about thirty of them common to our own country. They are thus divided into sections.

A. Lip dilated, bifid; jaw one-toothed.

B. Lip rounded, entire; jaw one-toothed. The mycetophagus of Fabricius.

C. Lip horny, entire; jaw bifid. The scaphidium of Fabricius.

D. Lip emarginate, conic; jaw bifid. The ips of Fabricius.

E. Lip heart-shaped, emarginate, crenate. The nicrophorus of Fabricius.

F. Lip square, emarginate. The sphæridium of Fabricius.

G. Lip long, entire; antennas serrate. The hypophlæus of Fabricius.

H. Lip and jaw unknown.

These are found, for the most part, under the loose bark of trees, or on the half-decayed carcases of animals, upon which both the grub and the insect feed.

The different species of silphæ vary but little from each other, either in form or colour. In Britain many of them are seen early in the spring, beneath the loose bark of trees. The silpha vespillo is one of the most remarkable of this genus, in consequence of the shape of its antennæ. They have at their extremity a reddish knob, produced by four small plates strung through the middle, one upon the other; the last being thicker, forms a small sharp-pointed knob. Head, thorax, and body black, charged with a few hairs of a yellowish hue: thorax of a rounded form, marked by several protuberances, the circumference terminated by a broad, flat margin: shells short, and, as it were, cut across, leaving about one third of the body uncovered: colour black, and variegated with two yellow transverse stripes. See plate CLXXVIII.

SILPHIUM, in botany, a genus of the class syngenesia, order polygamia necessaria. Receptacle chaffy; seeds crowned with a two-awned margin; calyx spreading every way. Eleven species, all natives of America. The following are cultivated.

1. S. laciniatum. Jagged-leaved silphium.
2. S. terebinthinum. Broad-leaved silphium.
3. S. asteriscus. Hairy-stalked silphium.
4. S. trifoliatum. Three-leaved silphium.

Most of these bear a corol that has some resemblance to the sun-flower, and rise from a perennial, woody root, with a thick, strong, upright stem, three or four feet high.

SILT. *s.* Mud; slime (*Hale*).

SI'LVAN. *a.* (from *silva*, Latin.) Woody; full of woods (*Dryden*).

SILVANITE, in mineralogy, a species of TELLURIUM, which see.

SILVANUS, a rural deity, son of an Italian shepherd by a goat. From this circumstance he is generally represented as half a man and half a goat. According to Virgil he was son of Picus. The worship of Silvanus was established only in Italy. He was sometimes represented holding a cypress in his hand, because he became enamoured of a beautiful youth, Cyparissus, who was changed into a tree of the same name. Silvanus presided over gardens.

SILVER. (*Silber*, German; *argent*, Fr.) A metal of a pure white colour, without either taste or smell, and in point of brilliancy inferior to none of the metallic bodies, if we except polished steel. It is very malleable, soft, fusible at a full red heat, but not oxydable by exposure to the air while melting. Soluble with ease in nitrous acid, and precipitable from its solution in the form of a white curd by muriatic acid, or any of the neutral muriats.

Of its different ores we have already treated in their regular mineralogical arrangement under the article ARGENTUM, to which the reader may turn at his leisure. We shall here notice the metal somewhat more historically and chemically.

Native silver is generally found in irregular shapes; sometimes in masses of no determinate form, sometimes branched, occasionally in capillary filaments, and not uncommonly in leaves. Thus it appears in most mines, and particularly in those of Siberia, where Patrin tells us he never met with it crystallized. It is found in the mines of Peru in a vegetable form, imitating the leaves of fern. This variety of figure in native silver is

occasioned by a vast number of little eight-sided crystals, so disposed upon each other as to give the whole the appearance of a vegetable. The curved cylindrical filaments, in which form silver is sometimes found, are of various sizes, from the thickness of a finger to the diminutive size of a hair. Native silver, as we have observed, is seldom found pure, but is generally mixed with other metals; such as gold, copper, mercury, iron, lead, &c. This last metal almost always contains a portion of silver, though frequently so small as not to be worth the expense of separating it. In the reign of Edward I. nearly 1600 pounds weight of silver were obtained in the course of three years, from a mine in Devonshire, which had been discovered about the year 900. The lead mines in Cardiganshire have, at different periods, afforded great quantities of silver. Sir Hugh Middleton is said to have cleared from them 2000 pounds in a month. The same mines yielded, about the year 1745, eighty ounces of silver out of every ton of lead. The lead ores from Brunghill and Skekorn produced also a considerable quantity of silver. The lead only, in one of the smelting houses at Holywell, in Flintshire, produced no less than 31,521 ounces, or 3126¾ pounds of silver, from the year 1754 to 1776. "There are some lead ores in this country," says Dr. Watson, "which, though very poor in lead, contain between three and four hundred ounces of silver in a ton of that metal. It is commonly observed, that the poorest lead ores yield the most silver, so that a large quantity of silver is probably thrown away in England, from not having the poorest sort of lead-ores properly assayed."

Silver in its mineral state occurs massive, disseminated, in blunt cornered pieces, in plates, and in membranes: it is said to occur also in Spanish America in rolled pieces. Its crystallizations are very various, as the cube, octahedron, prism, pyramidal, &c.: the crystals are small and microscopic. It is chiefly found in primitive earths, especially in those which are deposited in beds, though it is not confined to these alone. It is very rarely met with in granite, but not uncommonly in the fissures of micaceous rocks, and in other places of a similar nature, but of more recent formation. In the secondary earths silver often occurs, being often found in chalk, slate, &c.; but almost always mineralized by sulphur or arsenic. It is a singular fact that the situations of gold and silver mines should often be diametrically opposite in point of temperature. Gold is common in the hottest parts of the earth, while we generally find silver mines in the cold regions. Thus, the chief parts of the world where silver is to be met with are Sweden, Norway, and the higher latitudes near the pole: if we find it in hot climates, it is seldom on level ground; but, on the contrary, raised to a great height towards the tops of mountains that are perpetually covered with ice and snow. It is thus situated in the alpine mountains of Europe and America; and such are the mines of Allemont in France, and those of Potosi in the Andes. The principal silver mine in Europe is that of Konigsberg, in Norway, to the north of Christiana. This is the richest, the most important, and one of the most singular mines in that quarter of the globe. The district in which it is situated is mountainous; and the mines are divided into superior and inferior, on account of their relative position. The earth is composed of beds nearly in a vertical position, and running from north to south. Some are composed of quartz mixed with mica, of granite, and of chalk: while others are formed of whitish-grey quartz, mixed with fine blackish mica, or else consist of ferruginous rock. These beds are of very considerable thickness, and contain a great quantity of native as well as of mineralized silver. The veins are richer in mineral, and their produce more considerable, where they traverse the beds of ferruginous rock, than in any other part. The most remarkable mine of silver in Spain is that of Guadalcanal, in Andalusia, which was formerly very rich, and well known to the Romans. It is situated in the Sierra Morena, or black mountain, on the confines of Andalusia and Estremadura, 15 leagues to the north of Seville, and several miles to the north-east of the famous quicksilver mine at Ald Almaden. The mineral obtained here is the ruby silver ore. But it is in the centre of the Andes, in situations which, though immediately exposed to the perpendicular rays of the sun, are constantly covered with snow, that nature has most abundantly distributed this metal. In 20 degrees of southern latitude, within the torrid zone, we find the famous mountain of Potosi, situated near the source of the Rio de la Plata. This mountain is one of the most considerable in Peru; its height is immense; and it appears from the description of travellers, that from top to bottom it is full of veins of silver. When these mines were first discovered, in the year 1545, the veins were so rich as to be almost entirely composed of silver without any mixture. At present, however, the produce is very different, scarcely more than five drams being obtained from a hundred weight of ore; still, from the great abundance of mineral, the produce is very considerable. According to the observations of several Spanish naturalists, the mountain of Potosi alone, from the time it was first discovered, in 1545, till the year 1638, that is in the space of 93 years, yielded four hundred millions of pesos, or ounces of silver.

The analysis of silver ore varies according to its nature and combinations. Native silver, after being broken down and washed, is rubbed with liquid mercury, which by strong trituration dissolves and combines with the silver. This amalgam is subjected to pressure, to separate the excess of mercury. It is then distilled, and afterwards heated in a crucible, to volatilize the mercury, and the silver remains pure. When silver is combined with antimony and sulphur, the ore is to be strongly roasted, to separate the antimony or sulphur.

It is then melted with a proper quantity of alkaline flux. The sulphurated oxyd of silver and antimony may be treated in the same way. See ASSAYING.

Silver is of a fine white colour and great brilliancy. The specific gravity is 10.4, and according to some, when it is hammered, 10.5, and sometimes nearly 11. The hardness of silver is intermediate between iron and gold. The elasticity of silver is considerable, and it is one of the most sonorous of the metals. It possesses very great ductility and malleability. It may be beaten out into leaves of $\frac{1}{100000}$ of an inch thick, and a grain of silver may be so extended as to be formed into a hemispherical vessel of sufficient capacity to hold an ounce of water, or to be drawn out into a wire 400 feet in length. The tenacity of silver is very great. A wire .078 of an inch in diameter will support a weight of 187 pounds avoirdupois. Silver is a good conductor of caloric. Its expansive power is less than that of lead and tin, and greater than that of iron. When it is exposed to a white heat it melts. The temperature necessary to bring it to fusion has been calculated at the 1000° of Fahrenheit; but, according to Kirwan, it requires a higher temperature than 28° Wedgewood to melt it, although at that temperature it continues in a state of fusion. When it is cooled slowly after fusion, it exhibits some marks of crystallization. It assumes the form of four-sided pyramids, or of octahedrons. If the heat be increased after the silver is melted, it boils, and may be reduced to vapour. The surface of melted silver is so extremely brilliant, that it seems to throw out sparks, which is called coruscation by the workmen. Silver is a good conductor of electricity. It has no perceptible taste or smell.

Silver is not oxydated by exposure to the air: it gradually, indeed, loses its lustre, and becomes tarnished; but this is owing to a different cause. Neither is it altered by being kept under water. But if it is kept for a long time melted in an open vessel, it gradually attracts the oxygen from the atmosphere, and is converted into an oxyd. Macquer, by exposing silver 20 times successively to the heat of a porcelain furnace, obtained a glass of an olive-green colour. Nay, if the heat is sufficient, the silver even takes fire and burns like other combustible bodies. Van Marum made electric sparks from his powerful Teylerian machine pass through a silver wire; the wire exhibited a greenish-white flame, and was dissipated into smoke. Before a stream of oxygen and hydrogen gass, it burns rapidly with a light-green flame.

The oxyd of silver, obtained by means of heat, is of a greenish or yellowish grey colour; and is easily decomposed by the application of heat in close vessels, or even by exposing it to the light. When silver is dissolved in nitric acid, and precipitated by lime water, it falls to the bottom under the form of a powder, of a dark-greenish brown colour. From the experiments of Wenzel and Bergman it follows, that the greenish or yellowish grey oxyd is composed of about 90 parts of silver and 10 of oxygen. When this oxyd is exposed to the light, part of its oxygen is separated, as Scheele first ascertained; and is converted into a black powder, which contains but a very small portion of oxygen, and may be considered as silver reduced. By exposing the solution of silver in nitric acid to sunshine, the silver precipitates in the form of a flea-brown powder.

Neither carbon nor hydrogen has been combined with silver; but it combines readily with sulphur and phosphorus.

1. When thin plates of silver and sulphur are laid alternately above each other in a crucible, they melt readily in a low red heat, and form sulphuret of silver. It is of a black or very deep violet colour; brittle, but capable of being cut with a knife; often crystallized in small needles; and much more fusible than silver. If sufficient heat is applied, the sulphur is slowly volatilized, and the metal remains behind in a state of purity. It is very difficult to determine the proportion of the ingredients which enter into the composition of this substance, because there is an affinity between silver and its sulphuret, which disposes them to combine together. The greatest quantity of sulphur which a given quantity of silver is capable of taking up is, according to Wenzel, $\frac{13}{100}$.

It is well known, that when silver is long exposed to the air, especially in frequented places, as churches, theatres, &c. it acquires a covering of a violet colour, which deprives it of its lustre and malleability. This covering, which forms a thin layer, can only be detached from the silver by bending it, or breaking it in pieces with a hammer. It was examined by Mr. Proust, and found to be sulphuret of silver.

2. Silver was first combined with phosphorus by Mr. Pelletier. If one ounce of silver, one ounce of phosphoric glass, and two drams of charcoal, are mixed together, and heated in a crucible, phosphuret of sulphur is formed. It is of a white colour, and appears granulated or crystallized. It breaks under the hammer, but may be cut with a knife. It is composed of four parts of silver and one of phosphorus. Heat decomposes it by separating the phosphorus. Pelletier has observed, that silver in fusion is capable of combining with more phosphorus than solid silver: for when phosphuret of silver is formed by projecting phosphorus into melted silver, after the crucible is taken from the fire, a quantity of phosphorus is emitted the moment the metal congeals.

Silver does not combine with the simple incombustibles.

Silver combines readily with the greater number of metallic bodies.

1. When silver and gold are kept melted together, they combine, and form an alloy composed, as Homberg ascertained, of one part of silver, and five of gold. He kept equal parts of gold and silver in gentle fusion for a quarter of an hour, and found, on breaking

the crucible, two masses, the uppermost of which was pure silver, the undermost the whole gold combined with $\frac{1}{5}$ of silver. Silver, however, may be melted with gold in almost any proportion; and if the proper precautions are employed, the two metals remain combined together.

The alloy of gold and silver is harder and more sonorous than gold. Its hardness is a maximum when the alloy contains two parts of gold and one of silver. The density of these metals is but little increased; but the colour of the gold is much altered, even when the proportion of the silver is small; one part of silver produces a sensible whiteness in 20 parts of gold. The colour is not only pale, but it has also a very sensible greenish tinge, as if the light reflected by the silver passed through a very thin covering of gold. This alloy being more fusible than gold, is employed to solder pieces of that metal together.

2. When silver and platinum are fused together (for which a very strong heat is necessary), they form a mixture, not so ductile as silver, but harder and less white. The two metals are separated by keeping them for some time in the state of fusion: the platinum sinking to the bottom from its weight. This circumstance would induce us to suppose that there is very little affinity between them.

The affinities of silver, and its oxyds, are placed by Bergman in the following order:

Silver.	*Oxyd of Silver.*
Lead,	Muriatic acid,
Copper,	Oxalic,
Mercury,	Sulphuric,
Bismuth,	Saclactic,
Tin,	Phosphoric,
Gold,	Sulphurous,
Antimony,	Nitric,
Iron,	Arsenic,
Manganese,	Fluoric,
Zinc,	Tartaric,
Arsenic,	Citric,
Nickel,	Lactic,
Platinum,	Acetic,
Sulphur,	Succinic,
Phosphorus.	Prussic,
	Carbonic.

SILVER (Fulminating). See FULMINATION.

SILVER-LEAF, that beaten out into fine leaves for the use of the gilders, which is performed in the same manner as gold-leaf.

SILVER-WIRE, that drawn out into fine wire; for the manner of doing which, see the articles GOLD-WIRE, and WIRE-DRAWING.

SILVER (Shell), is prepared of the shreds of silver-leaves, or of the leaves themselves, for the use of painters, after the same manner as shell-gold. See GOLD.

SI'LVER. *a.* 1. Made of silver (*Genesis*). 2. White like silver (*Spenser*). 3. Having a pale lustre (*Shakspeare*). 4. Soft of voice (*Spenser*).

To SI'LVER. *v. a.* (from the noun.) 1. To cover superficially with silver (*Shakspeare*). 2. To adorn with mild lustre (*Pope*).

SILVER-WEED. See POTENTILLA.

SILVER-BUSH. See ANTHYLLIS.

SILVER FIR. See PINUS.

SILVER TREE. See PROTEA.

SILVER FISH, in ichthyology. See ATHERINA.

SILVER-BEATER, one that foliates silver.

SILVERING (Art of). The coating or covering the surface of substances with silver is intended, like gilding, as a mean of protection, ornament, or superior wholesomeness, compared with the metal it overlays, as copper or brass. As an ornament silver is far inferior to gold, from its great liability to be blackened by sulphureous vapours, which renders frequent cleaning absolutely necessary. Hence it is inapplicable to the purpose of architectural decoration, and is scarcely ever applied except to utensils and ornaments of metal. From the frequent necessity of friction for the purpose of removing its ready tarnish, it is necessary that silver should be laid on much thicker than gold; for otherwise, after a short time, the silver will be worn off from the most prominent part, and the brass or copper beneath be exposed to view.

The metals that are usually covered with silver are copper and brass, and sometimes iron, and there are three distinct modes of performing the operation. 1. Silvering by amalgamation, is thus performed:—to a solution of nitrated silver add some plates of copper, which will throw down the silver in its metallic state, and very finely divided; scrape it from the surface of the copper, wash it well and dry it. Of this powder take half an ounce, of common salt and sal ammoniac two ounces, and of corrosive sublimate one drachm, rub them well together, and make them into a paste with a little water. Then take the vessel to be silvered, and clean it by means of a little very dilute aquafortis, or by scouring it with a mixture of common salt and tartar. When it is perfectly clean, rub it with the above-mentioned paste till it is entirely covered with a white metallic coating; this coating is an amalgam produced by the decomposition of the corrosive sublimate, by means of the copper, to the surface of which it applies very closely and expeditiously. The copper being thus silvered over, is to be washed, dried, and afterwards heated nearly red, in order to drive off the mercury; the silver remains behind, adhering firmly to the copper, and capable of being highly polished. 2. Silvering by luna cornea.—Prepare the lunea cornea in the usual manner, by pouring a solution of common salt into nitrat of silver, as long as any precipitation takes place, and boiling the mixture; the white curdy matter thus obtained is to be mixed with three parts of good pearl-ash, one part of washed whiting, and somewhat more than one part of common salt. The surface of the brass being cleared from scratches, is to be rubbed with a piece of old hat and rotten stone, to remove any grease, and then is to be moistened with salt and water; a little of the composition being now rubbed on

with the finger, the surface of the metal will presently be covered with silver. Then wash it well, rub it dry with soft rag, and, as the coat of silver is extremely thin, cover it with transparent varnish, to preserve it from tarnish. This kind of silvering is very imperfect, and is only used for the faces of clocks, the scales of barometers, and similar objects. 3. Silvering by silver in substance.—There are three ways of performing this. The first is, by mixing together 20 grains of silver, precipitated by copper, two drachms of tartar, two drachms of common salt, and half a drachm of alum; this composition being rubbed on a perfectly clean surface of copper or brass, will cover it with a thin coating of silver, which may afterwards be polished with a piece of soft leather. A still better way is that which is called French plating, which consists in burnishing down upon the surface of the copper successive layers of leaf-silver to any required thickness. In this the silver has much more solidity than in any of the former, but the process is tedious, and the junctures of the leaves of silver cannot always be entirely concealed. The English method of plating (in those works to which it is applicable) appears to be the best of all. It is thus performed: one of the surfaces of an ingot of copper is rendered quite smooth and clean, and is sprinkled over with glass of borax; upon this is laid a plate of fine silver, about one-twelfth of the weight of the copper, and the two are carefully bound together by wire; the mass is now exposed to a full red heat, which melts the borax, and causes the silver to adhere to the copper; the ingot is now passed through a rolling press, and formed into a plate; both the silver and copper extending uniformly during the whole process, at the conclusion of which the two metals are inseparably fixed to each other.—(*Aikin's Dictionary of Chemistry and Mineralogy.*)

SI'LVERLY. *ad.* (from *silver.*) With the appearance of silver (*Shakspeare*).

SI'LVERSMITH. *s.* (*silver* and *smith.*) One that works in silver (*Acts*).

SI'LVERY. *a.* (from *silver.*) Besprinkled with silver (*Woodward*).

SILURUS, in zoology, a genus of the class pisces, order abdominalia. Head naked, large, broad, compressed; mouth furnished with cirri resembling the feelers of insects; gape very large, extending almost the whole length of the head; lips thick, jaws furnished with teeth; tongue thick, smooth, very short; eyes small; gill-membrane with from four to seventeen rays; body elongated, compressed, without scales, mucous; lateral line near the back; first ray of the dorsal or pectoral fins serrate with reverse spines. Twenty-eight species, scattered through the rivers of the globe. They are divided into sections according to the number of their cirri, as follow:

A. Cirri two.
B. Cirri four.
C. Cirri six.
D. Cirri eight.
E. Cirrusless.

We shall select an example or two.

1. S. glanis. European silure. Dorsal fin single and unarmed. Head subpatulate, dusky-green; iris white; jaws arched, the lowe longer; gullet with four prominent denticulate bones; pectoral fins yellow, the base and tip blueish; dorsal and ventral yellowish at the base, blueish at the tip; anal long, and with the rounded tail ashy-yellow at the base and edged with violet. Inhabits deep fresh waters of Europe and of the East; grows to a vast size, sometimes weighing 300 pounds; swims slowly, and before storms comes to the surface of the water. Body thick, mucous, greenish-black; towards the belly greenish; beneath yellowish-white, varied with blackish and white spots; flesh good.

2. S. electricus. Electric silure. Dorsal fin single, fleshy. Inhabits the rivers of Africa; above twenty inches long; body long, very broad on the fore-part, depressed, pale ash-colour, with a few blackish spots towards the tail; when touched communicates a shock attended with trembling and pain of the limbs, but less violent than the torpedo or electric eel; flesh eatable.

3. S. clarias. Second dorsal fin fleshy; anal rays eleven. Inhabits the rivers of South America and of Africa; from twelve to fifteen inches long; body blackish-ash, beneath hoary; said to inflict venomous wounds with the serrated pectoral fin.

4. S. aspredo. Dorsal fin single, five-rayed. Base of the lateral cirri broad; back carinate; anal fin reaching to the tail; tail forked. Inhabits the rivers of America; more than a foot long, and of a very uncouth and forbidding appearance. This species is by some writers made a distinct genus of, under the name platystacus. See Nat. Hist. Pl. CLXXIX.

SIMANCAS, a town of Spain, in Leon, with a castle, in which, on account of its strength, Philip II. ordered the archives of the kingdom to be kept. It is situate on the Douero, eight miles S.W. of Valladolid. Lon. 4. 30 W. Lat. 41. 45 N.

SIMAROUBA (*simarouba*, a patronymic name of America.) Simarouba quassia. Quassia simarouba of the younger Linnéus. Quassia floribus monoicis, foliis abrupte pinnatis, foliolis alternis subpetiolatis petiolo nudo, floribus paniculatis. Supp. Plant. C. decandria. O. monogynia. The bark of this tree, which is met with in the shops, is obtained from the roots; and according to Dr. Wright of Jamaica, it is rough, scaly, and warted; the inside when fresh is a full yellow, but when dried paler; it has but little smell; the taste is bitter, but not disagreeable. It is esteemed, in the West Indies, in dysenteries and other fluxes, as restoring tone to the intestines, allaying their spasmodic motions, promoting the secretions by urine and perspiration, and removing lowness of spirits attending those diseases. It is said also that it soon disposes the patient to sleep; takes off the gripes and tenesmus, and changes the stools to their natural colour and consistence.

SIMBIRSK, a government of Russia, formerly a province of the kingdom of Kasan. The capital, of the same name, is seated on the Volga, 100 miles S. by W. of Kasan. Lon. 48. 34 E. Lat. 54. 22 N.

SIMEON OF DURHAM, the cotemporary of William of Malmsbury, took great pains in collecting the monuments of our history, especially in the north of England, after they had been scattered by the Danes. From these he composed a history of the kings of England, from A. D. 616 to 1130; with some smaller historical pieces. Simeon both studied and taught the sciences, and particularly the mathematics, at Oxford; and became precentor of the church at Durham, where he died, probably soon after the conclusion of his history, which was continued by John, prior of Hexham, to A. D. 1156.

SIMI, the ancient Syme, an island in the Mediterranean, between the island of Rhodes and the continent of Asia, six miles N. of Rhodes. Lon. 27. 33 E. Lat. 36. 35 N.

SIMIA. Ape. Baboon. Monkey. In zoology, a genus of the class mammalia, order primates. Fore-teeth in each jaw four, approximate; tusks solitary, longer, more remote; grinders obtuse. Sixty-three species, scattered over the warmer parts of Asia, Africa, and America: none of then indigenous to Europe. These greatly resemble man in the uvula, eye-lashes, hands, feet, fingers, toes, nails, and other parts of the body; yet differ widely in the total want of reason; are of retentive memory, imitative, and full of gesticulations; chatter with the teeth and grin; macerate their food in the cheeks before they swallow it; are filthy, lascivious, thieving, gregarious, and the prey of leopards and serpents. The genus is divided into the following sections.

A. Tailless. Apes.
B. Tails short. Baboons.
C. Tail long, not pretensile, cheeks pouched, haunches naked. Monkeys.
D. Tail pretensile; without cheek-pouches; haunches covered. Sapajous.
E. Tail not pretensile; without cheek-pouches; haunches covered. Sagoins.

We shall select a few examples from each division.

1. S. troglodytes. Angola ape. Head conic, body brawny, back and shoulders hairy, rest of the body smooth. By many naturalists regarded as a mere variety of S. satyrus.

2. S. satyrus. Oran-otan. Orang-outang. Satyr. Jocko. Wild man of the woods. Troglodyte-man. Great ape. Rusty brown, hair of the fore-arms reversed, haunches covered. Greatly resembling man, even in the hyoid bone, yet with the rest of his tribe, wants the nail of the great toe; and from the structure of the larynx, muscles, and whole frame of the bones, evidently not designed to walk erect: palms smooth, thumbs shorter than the palms; feet well formed, great toe short, the rest long. From three to five feet high: inhabits the island of Borneo.

γ. Pogo. This constitutes another variety of the species; without cheek pouches, or callosities on the haunches; and always walks erect. It inhabits Java and Guinea; from five to six feet high.

γ. Another variety resembling the pogo, but only two and a half feet high; docile, gentle, grave: probably only differing in age.

The manners of this species when in captivity are gentle, and often affectionate; yet in the woods they are said to be often highly ferocious. The negroes regard them with terror as a foreign race come to conquer and appropriate their country; who though capable of articulate language, maintain a stubborn silence, that they may not be compelled to labour; they often attack, and beat or kill the negroes; feed on nuts and other fruits; drive off elephants and other large animals with clubs, or even beat them with their fists; walk erect, but occasionally creep on all four; climb trees with great agility; and commonly secure themselves, by night, among the branches. Rude huts of their construction are said to have been sometimes observed. Woods and mountains of difficult access are their only haunts. They associate only in small herds. A fire kindled at any time in the woods attracts them round it: they warm themselves eagerly while it continues to burn; but know not how to keep it alive, or rekindle it. Their carriage and manners are grave and stately. It does not appear that they unite to practise any ingenious arts, or carry on any great enterprises in common. They are very salacious: the period of gestation and natural term of life not exactly known.

The Indians and Africans often shoot them with poisoned arrows. The young are sometimes taken alive; the old are secure from capture by their strength and swiftness.

Some individuals have been exhibited alive in Europe; and several have died in their passage from their native regions.

In confinement, for we cannot with propriety say, in a domesticated state, they have seldom discovered remarkable ferocity. They have even been brought to imitate the manners of mankind with considerable dexterity and address. An orang-outang has been known to pay a ready obedience to words and signs. M. de Buffon relates, that he had seen one sit at table, open his towel, wipe his lips, carry his victuals to his mouth with a spoon or fork, pour his wine into a glass, and hob-nob with the person who drank. If invited to drink tea, he would bring a cup and saucer, place them on the table, put in sugar, pour out the tea, and wait till it cooled before attempting to drink. He received sweetmeats with great fondness; and was accordingly pampered with such quantities of them, that, by increasing a cough with which his breast was affected, they contributed to shorten his days. M. de la Brosse relates of two orang-outangs, a male and a female, which he had purchased in Africa, that they would sit at table, and help themselves with their food like human beings:



Orang Outang.



Sloth.

London, Published by Sherwood & Cº Paternoster Row, June 1ª 1823.

they would make signs for what they wanted, and express resentment when neglected. The male falling sick, required attendance just as a man would have done. He even allowed himself to be twice bled in the right arm; and whenever he happened afterwards to find himself ill, he would hold out his arm to be bled, as if still sensible what benefit he had formerly received from the operation.

2. S. sylvanus. Pigmy. Haunches naked; head roundish: arms shorter than the body. The flatness of their face and nails, the nakedness of their haunches, the want of a tail, and their upright carriage, give this species also some resemblance to the human form. But they are not larger in size than a common cat; the colour of the upper part of the body is an olive brown, beneath yellowish.

Individuals are often to be seen among our exhibitions of wild beasts. They feed on fruits; but are greedy of insects, particularly of ants, and search for them with eagerness and dexterity. They smile and frown, and learn to mimic our forms of salutation. The malice and mimicry of an ape are often alluded to in books and conversation. They contract such familiarity with mankind as to be easily fed with the hand.

They are natives of the different countries of Africa, and of the island of Ceylon. In Æthiopia they are numerous. These are the pigmies of antiquity, represented as a dwarfish nation of mankind, who waged war with cranes, and were at length utterly destroyed by their victorious enemies. Aristotle talks seriously of such a nation. But Strabo observes, that no person worthy of credit ever related that he had actually seen them. Ethiopia was one seat of that imaginary people; and the cranes of the Nile were those with which they were supposed to war. Mr. Addison has celebrated the war between the pigmies and the cranes in one of the finest specimens of modern Latin poetry. The Indians once wisely availed themselves of this fable. They embalmed the bodies of apes, and sold them to merchants as genuine remains of a pigmy race of mankind.

In their native forests, these animals assemble in troops, fly when attacked, but turn upon their pursuers, if overtaken, and often escape by flinging the subtile sand of the desert, to blind their eyes. To catch them, the natives put strong inebriating liquors into the caverns which they frequent; after intoxicating themselves, they fall asleep, and are then easily taken. They are more mild and docile, and easier tamed than any other species of the ape: they chatter when pleased, and use threatening gestures when angry; drink from the palm of the hand.

3. S. lar. Long-armed ape. Haunches naked; arms as long as the body. This species is easily distinguished by the length of his arms, which touch the ground when the animal stands erect. His flat swarthy visage, surrounded with grey hairs, his erect carriage, the want of a tail, flat nails, and round naked ears, gives this creature also a distant resemblance of the human figure, though hideously deformed. His body is rough, all covered with black hair, except his haunches. Feet long; eyes large, but sunk deep in their sockets: canine teeth proportionably larger than those of man. Height from two and a half to four feet.

These animals are mild and gentle in their manners. Their movements are not too brisk or precipitant, but lively and quick. They walk erect, and never on all four. In the East Indies, where they are native, in the interior parts of Bengal, on the Coromandel coast, in Malacca, the Malucca islands, and in Sumatra, they are seen by hundreds on the tops of trees.

They are found also in more northern provinces, as far as the frontiers of China; but they are afraid of cold and moisture, and do not live long in a climate more severe than that in which they have been bred. Their food consists of the fruits, leaves, and bark of trees. There are some varieties of this species with respect to size and colour; but their distinctive characters and manners are similar.

4. S. inuus. Magot. Haunches naked; head oblong. This creature is a remove still farther from the human form. Its face is long, and not unlike that of a bull-dog. Agreeable to this character, its canine teeth are both long and strong. Its ears resemble those of the human species; its nails are flat. The upper part of its body is of a dirty greenish brown, its belly of a dull pale yellow. It has down on its face and cheek pouches. It has also large prominent callosities on its haunches, and a small appendix of skin apt to be mistaken for a tail. It walks on the two hind feet at times, but more frequently on all four. When erect upon its two hind legs, it is generally two feet and a half high; some are three, others are four in height. Apes of this species inhabit many parts of India, Arabia, and all parts of Africa, except Egypt. They agree with the temperature of our climate the best of any species of the tailless tribe; but they are ill-natured, mischievous, and fierce. By the force of discipline, they are made to play some tricks in our common exhibitions of animals; yet are more dull and sullen than the rest of the ape tribe. In India, they assemble in the fields in great troops, and frequently attack women going to market, and rob them of such articles of provision as they happen to carry. In the woods, the females carry their young in their arms, and leap from tree to tree with them. Their food is of the same sort with that of the others of the same genus; they too, like the rest, sleep perched upon trees. Three and a half feet high.

Apes were worshipped in India, and magnificent temples were erected to their honour.

When the Portuguese plundered one in Ceylon, they found, in a little golden casket, the tooth of an ape, a relique held in such veneration by the natives, that they offered

700,000 ducats to redeem it; but in vain; for it was burnt by the viceroy to stop the progress of idolatry. Butler, in his Hudibras, hints at this piece of history.

5. S. sphinx. Great baboon. This of course belongs to section B. Mouth with whiskers, nails acuminate, haunches naked. When erect, from three to five feet in height, excessively fierce, libidinous and strong: eyes of a hazel colour; ears small and naked; head like that of a dog, but very thick; middle of the face and forehead naked, of a bright vermilion colour; tip of the nose of the same colour, but truncated like that of a hog; sides of the nose broadly ribbed, and of a fine violet hue; opening of the mouth very small; cheeks, throat, and goat-like beard, yellow; hair on the forehead long and black, and turned back like a toupee. The rest of the head, the arms and legs, covered with short hair, yellow and black intermixed; the breast with long whitish yellow hair; the shoulders with long brown hair; hair of the belly ash-colour, speckled like the sides of the partridge: nails flat; feet and hands black; tail erect, and very hairy, from four to six or seven inches in length; rump of a vermilion colour; and the beautiful colours on the hips gradations from red to blue; inside of the thighs a light blue.

These baboons, though mischievous and fierce, are not carniverous. They live chiefly on fruits, roots, and seeds, and assemble in troops for the purpose of robbing gardens, orchards, and vineyards. On such expeditions, some of them enter the inclosure, while others remain on the wall as centinels, to give notice of any approaching danger. The rest of the troop are stationed without the garden, at convenient distances from each other, and thus form a line, which extends from the place of pillage to that of their rendezvous. Their stations being thus taken, they commence their operations, and throw to those on the wall melons, gourds, apples, pears, or other fruits. Those on the wall throw them to their associates below; and thus the spoils are handed along the whole line. They are so dexterous and quick-sighted, that they seldom allow the fruit to fall in throwing it from one to another. All this is performed in profound silence, and with great dispatch. When the centinels perceive any person, they cry; and, at this signal, the whole troop fly off with astonishing rapidity. They are passionately fond of raisins and apples, and refuse no fruits which grow in gardens They neither eat fish nor flesh, except when boiled or roasted; when they devour both with avidity. They are also fond of cheese.

Buffon thus describes one that he saw: "Perpetually grinding his teeth, fretting and chafing with rage, his owner was obliged to keep him confined in an iron cage, the bars of which he moved so powerfully with his hands, that he inspired the spectators with terror. He is a squat animal, whose compact body and nervous members indicate strength and agility. He is covered with long close hair, which gives him the appearance of being larger than he is in reality. His strength, however, is so great, that he would easily overcome one, or even several men, if not provided with arms. Besides, he is continually agitated by that passion which renders the gentlest animals ferocious. He is insolently salacious; affects thus to show himself, and seems to be tormented with the most inordinate desires. Other apes are taught modesty by the whip; but the baboon is perfectly incorrigible; nothing can tame him. Notwithstanding the violence of their passion, these animals produce not in temperate climates. The female generally brings forth but one young one at a time, which she carries between her arms, and fixed to her pap. They abound in the hotter parts of Africa, in Borneo and the Philippine islands.

Schreber says, that this species lives likewise on nuts; that it is very fond of eggs, and will put eight at once into its cheek pouches; and taking them out one by one, break them at the end, and swallow the yolk and white; that it will drink quantities of wine and brandy; that it is less agile than other baboons, but very cleanly; and that it removes its excrements out of its hut.

6. S. maimon. Ribbed nose baboon. Beard thin; cheeks blue, striate; haunches naked. This baboon has a long naked nose, of a blue colour, compressed sideways, and ribbed obliquely on each side; on the chin a short orange beard: tail between two and three inches long, very hairy, and erect; hair soft and long, reddish brown upon the body, grey upon the breast and belly: ears, palms of the hands, and soles of the feet, naked.

The ugliness of this baboon is perfectly disgusting. From his nostrils distils perpetually a kind of mucus, which, with his tongue, he is perpetually licking. His body is of a squat figure; his haunches of a blood colour. The deep longitudinal wrinkles or ribs, on each side of his nose, augment the sullenness and deformity of his aspect. These weep and groan like a man. They differ as to size; some are only two feet long from the nose to the tail; others four, or even five. They are more tractable, and less impudent than the great baboon, but equally disagreeable. They are found on the Gold coast, and other southern provinces of Africa, and are called boggo by the negroes, and mandrill by the Europeans.

The animal called the smitten by some writers, is to be referred to this species. It is of a mouse colour, grows to the size of five feet, is very fierce, and will even attack a man.

Pennant refers to this species the *tre, tre, tre, tre* of Madagascar also, which the translator of Buffon classes with the great baboon. This animal is described to be of the size of a calf of two years old; to have a round head; the visage and ears of a man; the feet of an ape; its hair curled; and to be a solitary species, greatly dreaded by the natives.

7. S. sylvatica. Wood baboon. Face, hands,

and feet naked, black, smooth; nails white; body covered on all parts with long hair, elegantly mottled with black and tawny. The tail measures not quite three inches; very hairy on the upper part.

When erect, the animal is about three feet high. He inhabits Guinea, and is called by the English, The Man of the Wood.

8. S. variegata. Yellow baboon. Bright yellow mixed with black; face long, black, naked; hands covered on the back with hair. This creature greatly resembles the wood baboon, except in size and colour, and its hairy hands. Its ears are hid in its fur; there are several long dusky hairs over its eyes; colour a bright yellow, mottled with black. It is about two feet high, and a native of Africa.

9. S. cinerea. Cinereous baboon. Face dusky; beard pale-brown; crown mottled with yellow. His body and limbs cinereous. About two feet high; supposed to inhabit Africa.

10. S. livea. Blue-faced baboon. This animal has a bluish face; two very flat and broad foreteeth; a pale brown beard; long hairs over each eye; and a tuft of hair behind each ear; hair of the body black, and cinereous, mixed with a dull rust colour. Height about three feet. This and the three preceding species are described from specimens in the late Leverian Museum.

11. S. platypygos. Brown baboon. Pointed ears, and face of a dirty white; muzzle large and broad; colour of the upper part of the body brown, of the under ash colour; tail tapering, almost bare, and about four inches long. Its legs are much longer in proportion to the size of its body than those of the great or rib-nosed baboon. It is more frequently to be seen in the exhibitions of wild beasts.

Many of the females of this tribe, and especially those with bare haunches, menstruate.

12. S. apedia. Little baboon. Thumb close to the fingers; nails narrow and compressed; those of the thumb rounded: colour of the hair yellowish, tipt with black: face brown; tail less than an inch long; haunches covered with hair; about the size of a squirrel; an inhabitant of India, and a lively creature.

13. S. cristata. Crested baboon. Long dishevelled hair of a dusky colour on the crown and cheeks; breast whitish; the rest of the body and limbs covered with long black hair; face and feet black and bare; tail slender and tapering, about seven inches long. The whole length of the animal about two feet. It inhabits Africa.

14. S. nemestrina. Pigtail baboon. This species is easily distinguished by its tail, which is four inches long, slender, exactly like a pig's, and almost naked; face of a swarthy redness, pointed, but not so long as that of the last species; ears of the human form; eyes of a hazel colour. It has two sharp canine teeth; crown of the head dusky; hair on the limbs and body brown, inclining to an ash colour, palest on the belly: fingers black; nails long and flat: thumbs on the hind feet very long, and connected to the nearest toe by a broad membrane: height from head to tail twenty-two inches. Though full of vivacity, it has none of that impudent petulance common to the other baboons; but is gentle, tractable, and even caressing. It is found in Sumatra and Japan. In the latter country, it is taught tricks, and carried about by mountebanks. One of these people informed Kæmpfer, that the baboon he had was one hundred and two years old.

There was one brought from Sumatra to England in 1752. It was a male, about the bigness of a house-cat, extremely lively, and full of action. It lived only twelve months in London.

We now proceed to section C. or monkies.

15. S. hamadryas. Tartarin monkey. Cinereous; ears hairy; nails sharpish; haunches red. This creature has a long, thick, and strong nose, covered with a smooth red skin: eyes small; ears pointed and almost hid in the fur: head large and flat; hair on the sides of the head and the fore part of the body, as far as the waist, very long and shaggy; grey and olive brindled; on the top and hind part of the head, on the limbs and hind part of the body, very short: limbs strong and thick; hands and feet dusky: nails on the fore feet flat; those on the hind like a dog's: haunches very bare, and of a blood colour: tail scarcely the length of the body, and carried generally erect. These inhabit, in vast troops, the hottest regions of Africa and of Asia. They are very fierce; excessively impudent, and lascivious. They rob gardens; and are dangerous to passengers not expecting them. When they dare not attack passengers, they run up trees, shake the boughs at them with great fury, and chatter very loud. In Arabia Felix they infest the woods by hundreds, and oblige the owners of the coffee plantations to be continually on their guard against their depredations. They are quite untameable. Some of them are above five feet high.

The ursine or bear baboon seems to be a variety of this species. It is covered with long dusky hair, and has, at first sight, the appearance of a young bear; whence its name: head prominent, a long and thick nose, and short ears: crown covered with long upright hairs. The part of the head immediately above the forehead prominent, and terminating in a ridge: body thick and strong; limbs short; tail half the length of the body, and arched at the end: nails flat and round; buttocks of blood red. When sitting, measures four feet in height; and when erect, as high as a middle-sized man. These are very numerous near the Cape of Good Hope, and go in troops among the mountains. When they see any person approach, they set up an universal and horrible cry, for about a minute or two, and then conceal themselves in their fastnesses, keeping a profound silence. They hardly ever descend into the plains, unless to pillage the gardens which lie at the foot of the mountains. It is said that plundering parties place centinels to prevent surprise; that, on sight of a man, the

centinel gives a yell, and the whole troop retreats with great expedition, in a most diverting manner, the young clinging to the backs of the parents.

When taken and confined, they become tolerably tame, but are very revengeful when provoked. They are strong enough to overpower the stoutest man, notwithstanding all the resistance he can make. They usually lay hold of the ears, which they will bite off as close as if done with a razor.

16. S. siliens. Wanderer. This has a long dog-like face of a dusky colour; a very large and white or hoary beard; (the beards of the females brown); large canine teeth; nails flat; body covered with black hair; belly of a lighter colour; two feet high: inhabits Guinea.

There was one shewn in London some years ago, excessively fierce and ill-natured; its tail not longer than its back, and terminating in a large tuft; the beard reached quite up the cheeks as far as the eyes. To those already specified may be added, the little-bearded men about two feet high, black as jet, with long white beards, mentioned by different voyage-writers as inhabiting India and Guinea. The negroes set a great value on the skins of this species, and sell them to one another at eighteen or twenty shillings each. Of these skins they make the caps for the tie-ties or public criers.

17. S. siliens. Lowando. Beard black; body white. Another variety with the beard white; tusks long, large; head surrounded with a broad mane; body long, tapering; from three to three and a half feet high. Inhabits Ceylon; wild, ferocious, mischievous.

18. S. faunus. Malbrouk. Bearded; tail bushy at the end. Body blackish; breast, belly white; beard hoary, pointed; hardly a foot high. Inhabits Bengal.

19. S. cynomolgus. Macaque or hare-lipped monkey. Beardless; nostrils bifid or divided like those of a hare; nose thick, flat, and wrinkled; head large, eyes small, teeth very white, body thick and clumsy; haunches naked; colour varying sometimes like that of a wolf, but in others brown, tinged with yellow or olive; belly and inside of the limbs of a light ash colour; tail rather shorter than the body, and arched. Inhabits India, Guinea, and Angola, and is full of frolic and ridiculous grimace.

Pennant reckons the Malbrouk only a variety of this species. There was one shewn in London some years ago, equal in size to a small greyhound.

Animals of this species are never more than half tamed, and always require a chain: they never produce when in bondage. When fruits and succulent plants fail, they eat insects, and sometimes descend to the margins of rivers and the sea coast, to catch fishes and crabs; they put their tail between the pincers of the crab, and whenever the pincers are closed, they carry it quickly off, and eat it at their leisure; they gather the cocoa nut, and are well acquainted with the method of extracting the juice for drink, and the kernel for food; they likewise drink the zari that drops from the bamboos, which they place on the tops of trees in order to extract the liquor; they are taken by means of a cocoa nut with a small hole made in it; they put their paw into the hole with difficulty, because it is narrow; and the people who are watching the opportunity, seize them before they can disengage themselves. In the provinces of India inhabited by the Bramins, who kill no animals, the number of this species is almost infinite. They come in troops into the cities, and enter the houses, at all times, with perfect freedom. In Amadabad, the capital of Guzarat, there are three hospitals for animals, where lame and sick monkeys, and even those who, without being diseased, choose to dwell there, are fed and cherished. Twice every week, the monkeys in the neighbourhood assemble in the streets of the city; they then mount upon the houses, each of which has a small terrace or flat roof, and lie there during the great heats. On those two days, the inhabitants fail not to lay upon the terraces rice, millet, sugar canes, and other fruits in their season. If these animals find not their provisions in the accustomed place, they break the tiles which cover the rest of the house; and commit great outrages. In places frequented by the monkeys, the birds dare not build their nests on the trees; for they never fail to destroy them.

It has been well observed that the ape tribes are in reality the masters of the forests; for their dominion is not disputed either by the tiger or the lion, since they easily escape them by their nimbleness, and live on the tops of trees secure beyond their reach. The only animals they have to dread are serpents, who make perpetual war upon them. Some of these serpents are of a prodigious size, and swallow an ape in a moment. Others are smaller, but more agile, and go in quest of monkeys along the branches of the trees; and the more effectually to secure their prey, watch the time when they are asleep. Thus, creatures that are the objects of our terror prey upon others that are objects of our disgust.

20. S. Diana. Spotted monkey. Bearded; forehead projecting; beard pointed: size that of a large cat, black, spotted with white; hind part of the back ferruginous; face black, beard pointed, black above, and white beneath, placed on a fattish excrescence; breast and throat white; white line passes from the nose over each eye in an arched form to the ears; another from the rump cross the thighs; the tail long, straight, and black; ears and feet of the same colour; has large canine teeth. It inhabits Guinea and Congo; is playful when young, and salutes passengers by nodding.

21. S. sabæa. Green monkey. Beardless: face black; haunches naked. Sides of the face bounded by long yellow hairs falling backward like a mustachio, and almost covering its ears, which are black, but shaped like those of the human face; head, limbs, upper part of the body and tail, covered with soft hairs of a

yellowish green colour at their ends, of an ash colour at the roots; the under side of the body and tail, and inner side of the limbs, of a silvery colour; tail very long and slender; size equal to that of a small cat.

Monkeys of this species inhabit different parts of Africa; they keep in great flocks, and live on trees in the woods, where they are almost entirely concealed by the leaves, and would scarcely be noticed, were it not for the branches which they break in their gambols; though in these they are very agile and silent; even when shot at, they do not make the least noise; but will unite in company, knit their brows, and gnash their teeth, as if they meant to attack the enemy. They are very common in the Cape de Verd islands: and are found in the territories of ancient Carthage: whence it is probable that they were known to the Greeks and Romans. Sir Ashton Lever had one from the East Indies, where they are also found.

22. S. Æthiops. White-eyelid monkey. Tailed; beardless; fore-top white, erect; arch of the forehead white. This species has a long, black, naked, dog-like face; the upper part of the eyelids of a pure white; ears black and like those of the human body; no canine teeth; hairs on the sides of the face; those beneath the cheeks longer than the rest; the colour of the whole body tawny and black; the nails on the thumbs and fore fingers flat; those on the others blunt claws; the tail, which it carries arched, as well as the hands and feet, black. Inhabits Madagascar: there is a variety with a white collar.

23. S. sephus. Mustache. Tailed; cheeks bearded; crown yellowish; feet black. Two crowns or large tufts of yellow hairs, like mustaches, before its ears, serve to distinguish this monkey, and to give it a name; it has a short nose of a dirty bluish colour, with a transverse stripe of white beneath it; the edges of both lips, and the space round the eyes, black; ears round, and tufted with whitish hairs; hair on the top of the head long and upright; some black hairs round its mouth; the colour of the hair on the head yellow mixt with black; body and limbs, a mixture of red and ash colour; the rest yellowish; under part of the body is paler than the upper; nails flat; length one foot; that of the tail eighteen inches. It is found in Guinea.

24. S. aygula. Egret. Tailed; beard scanty; colour grey; long face, and an upright sharp-pointed tuft of hair on the top of its head; hair on its forehead is black; upper part of the body of an olive, lower of an ash colour; eye-brows large; beard small; size of a small cat. Monkeys of this species are found in Java; they fawn on men and their own species, and embrace each other; they play with dogs, if they have none of their own species with them. If they see a monkey of another species, they greet him with a thousand grimaces. When a number of them go to sleep, they put their heads together; and make a continual noise during the night. There is another variety with a rounder head; face less black; body paler-brown.

We now proceed to the sapajous. Section D.

25. S. Beelzebub. Preacher monkey. Size that of a fox; black shining eyes, short round ears, and round beard: hair on the body shining black, long, yet so close that the animal appears quite smooth; feet and end of the tail brown; tail very long, and always twisted at the end.

Singular as the name preacher, applied to a species of monkeys, may appear, their history is no less so; and were it not supported by good authority, it would seem quite fabulous. Several other authors corroborate the evidence of Marcgraave, a writer of the first authority, and a most able naturalist, who resided long in the Brasils where these creatures abound. He speaks from his own knowledge, and tells us, that morning and evening they assemble in the woods; that one mounts upon a higher branch, while the rest seat themselves beneath; that when he perceives them all seated, he begins, as if it were to harangue, and sets up so loud and sharp a howl that a person at a distance would think a hundred joined in the cry; the rest, however, keep the most profound silence, till he stops and gives a signal with his hand; then, in an instant the whole assembly join in chorus, till he commands silence by another signal, which they obey in a moment; then the orator resumes his discourse, and finishes his address, and the assembly breaks up. Their clamour is the most disagreeable and tremendous that can be conceived; this faculty proceeds from the peculiar conformation of a hollow and hard bone placed in the throat, and called the throat-bone or os hyoides. These monkeys are very fierce, quite untameable, and bite dreadfully; though not carnivorous, they excite terror by their frightful voice and ferocious aspect. The female is of the same colour with the male, and differs from him only in being smaller; the females carry their young on their back, and leap with them from branch to branch, and from tree to tree; the young embrace, with their hands and arms, the body of the mother, and remain firmly fixed as long as she is in motion; when she wants to suckle, she takes the young in her paws and presents the breast to it, like a human wet-nurse. There is no method of obtaining the young one, but by killing the mother; for she never abandons it. When she is killed, it falls from her, and may be seized.

As they feed only on fruits, pot-herbs, grain, and some insects, their flesh is reckoned not bad eating. It resembles mutton, or the flesh of a hare. One of them is a meal for six persons. They are the most common game, and the most agreeable to the taste of the Amazon Indians; they roast one part, and boil the other: "We lived upon them," says a French writer, "during all the time we remained there, because we could procure no other food; and the hunters supplied us daily with as many as we

could eat. I went to see this species of hunting, and was surprised at the sagacity of these animals, not only in distinguishing particularly those who make war upon them, but also in defending themselves and providing for their own safety when attacked. When we approached, they all assembled together, uttered loud and frightful cries, and threw at us dried branches which they broke off from the trees. I likewise remarked, that they never abandon one another; that they leap from tree to tree with incredible agility; and fling themselves headlong from branch to branch, without ever falling to the ground; because, before reaching the earth, they always catch hold of a branch, either with their hands or tail; so that if not shot dead at once, they cannot be seized; for, even when mortally wounded, they remain fixed to the trees, where they often die, and fall not off till corrupted. Fifteen or sixteen of them are frequently shot before three or four of them can be obtained. What is singular, as soon as one is wounded, the rest collect about him, and put their fingers into the wound, as if they meaned to sound it; and when it discharges much blood, some of them keep the wound shut, while others make a mash of leaves, and dexterously close the aperture. This operation I have often observed with much wonder." "After I have shot at one," says Dampier, "and broke a leg or an arm, I have often pitied the poor creature to see it look and handle the wounded limb, and turn it about from side to side." When the savages shoot them with arrows, they extract the arrow out of their bodies with their own hands, like human creatures.

When these creatures are embarrassed, they assist each other in passing a brook, or in getting from one tree to another.

26. S. seniculus. Old man of the woods. Royal monkey. Tailed; bearded; red. The Indians call this the king of the monkeys; it is of a reddish bay colour, equally large and noisy as the last; the natives are particularly fond of its flesh. Europeans too eat it, when they have conquered their first aversion. When scalded to get off the hair, it looks very white, and has a resemblance shocking to humanity; that of a child of two or three years old, when crying. It inhabits the woods about Cayenne and the river Amazon; salutes passengers from the trees.

27. S. paniscus. Four-fingered monkey. This species is distinguished by having four fingers alone, its hands being quite destitute of a thumb; but the feet have five toes with flat nails; the face is long and flat, of a swarthy flesh-colour; eyes sunk in the head; ears like the human; limbs of great length, and remarkably slender; body is also slender, about a foot and a half long; tail about two feet long, naked below, near the end, and so prehensile as to serve every purpose of a hand. It inhabits Peru, Brasil, Guinea, and the neighbourhood of Carthagena. They are the most active of monkeys, and quite enliven the forests of America. In order to pass from top to top of lofty trees, whose branches are too distant for a leap, they will form a chain, by hanging down, linked to each other by their tails, swinging in that manner, till the lowest catches hold of a bough of the next tree, and draws up the rest. Sometimes they pass rivers by the same expedient. They are occasionally brought to Europe; but are very tender, and seldom live long in our climate. On account of the length and slenderness of their legs and tail, they are sometimes called spider monkeys. Unlike the preacher and royal monkey, they are of a mild and docile disposition. They are distinguished from the former also by the want of that osseous drum which they have in their throat, and with which they make such a howling noise. They are extraordinarily fat at the dry season, when the fruits are ripe. In the rainy season they are infested with a species of tænia.

28. S. trepida. Trembling monkey. Tailed; beardless; fore-top erect; hands and feet blue; tail hairy: another species with hair round the face grey; brownish-yellow on the body. This inhabits Guiana; is a lively species, but capricious in its affections in a state of captivity, having a great fondness for some persons, and as great an aversion to others; it is very agile, and its nimbleness and dexterity are extremely amusing. Of all the sapajous, the constitution of this species seems to be the best adapted to our climate. If kept warm in a chamber during the winter, they live comfortably in Europe for several years. They have been known to produce in France, and were observed to be, like almost every other species of monkey, passionately fond of their young: the father and mother are wont to carry the young one alternately, and when it does not hold properly, they give it a pretty severe bite. They are of a small size, not above a foot in length. From a certain singularity in their form, the female is frequently mistaken for the male. They walk always on four feet.

29. S. apella. Weeper. Brown sapajou. Tailed; beardless; body brown; feet black. This monkey smells of musk, is of a melancholy disposition, makes a noise like a young turkey, and appears as if always weeping; yet he is much disposed to imitate whatever he sees done; his face is round and flat, of a reddish brown colour; on the upper part of his head and body, the hair, which is very long and thinly dispersed, is black, tinged with brown; beneath, and on the limbs, tinged with red; tail black, and much longer than the head and body, which exceed not fourteen inches; he has a flat nail on each toe. Both old and young of this species are deformed. They inhabit Surinam and Brasil: keep in large companies, and make a great chattering, especially in stormy weather. They are mild, docile, and timid.

Buffon mentions a variety with a white throat.

30. S. sciurea. Orange monkey. Beard-

less; tailed; hind-part of the head prominent; nails of the four smaller toes angulate; haunches covered. This monkey is of the size of a squirrel, of a brilliant gold colour in Brasil, its native country; it smells of musk too, is a very tender animal, and seldom brought to Europe alive; it has a round head, a nose a little pointed, and the tip of its nose, and a circular space round its mouth, black; its ears are hairy; the hair on its body short, woolly, and fine; in the faded state in which it is seen in this country, of a yellow and brown colour; the nails on its hands are flat; those on the feet like claws.

From the gracefulness of its movements, the smallness of its size, the brilliant colour of its hair, the largeness and vivacity of its eyes, it has uniformly been preferred to all the other sapajous; it is indeed the most beautiful of this tribe. As the tail is less prehensile than that of the former species, it seems to form the shade between the sapajous and sagoins.

We now take leave of the sapajous, or monkeys with prehensile tails, and proceed to describe the sagoins or monkeys whose tails are straight and not prehensile, belonging to section E.

31. S. pithecia. Fox-tailed monkey. Tailed; beardless; hairs of the body long, black at the tips; tail black, shaggy. This species, which inhabits Guiana, is about a foot and a half in length, from nose to tail; tail longer, but like that of a fox; face swarthy, covered with a short white down; forehead, and sides of the face, covered with pretty long whitish hair; body with long dusky brown hair, white or yellowish at the points; hair on the tail very long and bushy; sometimes black, sometimes reddish; belly, and lower part of the limbs, of a reddish white. An amusing animal, and easily tamed.

32. S. midas. Tamarin. Tailed; beardless; upper lip cleft; ears square, naked; nails subulate: a beautiful animal, very lively, and also easily tamed, but so delicate that it cannot long resist the inclemency of our climate. It inhabits the hotter parts of South America, and the isle of Gorgona in the South Sea, south of Panama.

It has a round head, a swarthy, flesh-coloured, naked face; the upper lip a little divided; ears erect, very large, and almost square; the hair on the forehead upright and long; that on the body soft, but shaggy; the head, body, and limbs black, except the lower part of the back, which is tinged with yellow; hands and feet covered with orange-coloured hair, very fine and smooth; nails long and crooked; teeth very white; size that of a squirrel; tail black, and twice the length of the body. At low water they come to the sea-side to take muscles and periwinkles, which they dig out of the shells with their claws.

33. S. jacchus. Striate monkey. Tailed; ears hairy, broad. Tail curved, very hairy; nails subulate, of the thumbs and great toes rounded. There is a variety yellowish, and smelling of musk. This species is of a small size; its body being only seven inches long; tail near eleven; it weighs only about six ounces, and some not more than four and a half; it inhabits Brasil, and feeds on vegetables; but will also eat fish; it has but a weak cry, from the sound of which Buffon gives it the name of ouistiti; it is a very lively, restless creature, and is often brought over to Europe; head very round; ears like the human; but concealed in a front view of the animal, by two very long tufts of white hair standing out on each side; irids reddish; face almost naked, of a swarthy flesh-colour, with a white spot above the nose; head black; body ash coloured, reddish, and dusky; tail full of hair, annulated with ash colour, and black, in alternate rings; hands and feet covered with short hair; fingers like those of a squirrel; nails, or claws, sharp.

They have produced young in Portugal, where the climate is found favourable to them; and hence, it has been asserted, that they might be multiplied in the southern parts of Europe.

34. S. rosalia. Silky monkey. Tailed; beardless; head hairy; circumference of the face and feet red; nails subulate. Inhabits Guiana, and is very gentle and lively; length of its head and body about ten inches; tail thirteen and a half; a little bushy at the end; its constitution seems to be more robust than most of the others, as one of them has been known to live five or six years in France, with the precaution only of keeping it within doors, in a warm room, in winter. The silky softness of its coat has procured it its specific name; and its colours are not without beauty: its flat face, hands, and feet, are of a dull purple hue; its ears round and naked; on the sides of the face, the hairs are very long, and turned backwards; of a red or bright bay colour, sometimes yellow, and the former colour only in patches; the hair on the body is also long, very fine, glossy, and of a light, but bright yellow; its fingers have claws instead of nails. See Nat. Hist. Pl. CLXXVI.

SIMIÆ LAPIS. See BEZOAR SIMIÆ.

SIMI-CUM. (Greek.) An ancient instrument consisting of thirty-five strings. This instrument, which is mentioned by Athenæus, is not supposed to have produced as many different notes as it contained strings; one half of which is conjectured to have been in unison, or octaves, with the other, like the strings of the arch-lute, double-harp, or the harpsichord.

SI'MILAR. SI'MILARY. *a.* (*similaire*, Fr. from *similis*, Latin.) 1. Homogeneous; having one part like another; uniform (*Boyle*). 2. Resembling; having resemblance (*Hale*).

SIMILAR, in arithmetic and geometry, the same with like. Similar things have the same disposition or conformation of parts, and differ in nothing but as to their quantity or magnitude; as two squares, or two circles, &c.

In mathematics, similar parts, as A, *a*, have

the same ratio to their wholes B, *b*; and if the wholes have the same ratio to the parts, the parts are similar.

SIMILAR ANGLES, are also equal angles.

SIMILAR ARCS, of circles, are such as are like parts of their whole peripheries. And, in general, similar arcs of any like curves are the like parts of the wholes.

SIMILAR BODIES, in natural philosophy, are such as have their particles of the same kind and nature one with another.

SIMILAR TRIANGLES, are such as have the three angles in the one equal to the three angles in the other, each to each. They have also the sides about the equal angles proportional; and are to each other in surface as the squares of their like sides.

SIMILAR POLYGONS, have the same number of sides and angles, and the angles in each respectively equal. Their homologous sides are proportional; and their surfaces are as the squares of their homologous sides.

SIMILA'RITY. *s.* (from *similar*.) Likeness; uniformity (*Arbuthnot*).

SI'MILE. *s.* (*simile*, Lat.) A comparison by which any thing is illustrated or aggrandized (*Shakspeare*).

SIMILE, or SIMILITUDE, in rhetoric and poetry, a comparison of two things, which, though different in other respects, yet agree in some one.—As, "He shall be like a tree planted by the water-side," &c.

SIMI'LITUDE. *s.* (*similitudo*, Latin.) 1. Likeness; resemblance (*South*). 2. Comparison; simile (*Wotton*).

SI'MITAR. *s.* (see CIMETER.) A crooked or falcated sword with a convex edge.

To SI'MMER. *v. n.* To boil gently; to boil with a gentle hissing (*Boyle*).

SIMMEREN, a town of Germany, in the circle of Lower Rhine, capital of a duchy of the same name, with a castle. It belongs to the elector palatine, and is seated on the Simmeren, 26 miles W. of Mentz, and 35 E. of Triers. Lon. 7. 41 E. Lat. 49. 51 N.

SI'MNEL. *s.* (*simnellus*, low Lat.) A kind of sweet bread or cake.

SIMOGU, a town of the peninsula of Hindoostan, in the Mysore country, situate on the Tumbadra, 93 miles N.W. of Seringapatam. Lon. 75. 30 E. Lat. 13. 21 N.

SIMON OF DURHAM, a monk, in the reign of Edward III. whose chronicle in MS. in the library at Durham, was published at Oxford, by Hearne. The time of his death is not ascertained, but supposed to be about the year 1357, as he mentions David II. of Scotland being taken prisoner, and is silent as to his restoration.

SIMON (Richard), a learned French divine and critic, born at Dieppe in 1638, and educated among the priests of the oratory of that place. He afterwards went to Paris, where he distinguished himself by his knowledge of the oriental languages. He became a priest of the oratory about 1670. He wrote a great number of learned works, the principal of which is the Histoire Critique des Versions du Vieu et Nouveau Testaments. He died in 1712.

SIMON (St.), the cousin german of our Lord, according to the flesh, was the son of Cleophas, and of Mary, sister to the blessed Virgin. He was the disciple of Jesus, and was chosen bishop of Jerusalem after the death of James his brother. He was crucified in Syria, A. D. 107, in the 102d year of his age.

SIMON (St.), surnamed Zelotes, but for what reason does not appear, was another disciple of Jesus Christ, after whose death he preached the gospel in Egypt, Lybia, and Mauritania, where he suffered martrydom.

SIMON I. high priest of the Jews, and surnamed the Just, was the son of Onias I. whom he succeeded. He repaired the temple of Jerusalem, which had been laid in ruins, and surrounded it with a wall.

SIMON II. the grandson of the preceding, succeeded his father Onias II. In his time, Ptolemy Philopater visited Jerusalem, and entered the holy of holies in spite of the remonstrances of the high-priest.

SIMON-MACCHABÆUS, the son of Mattathias, was prince and high-priest of the Jews, in the year 143 B. C. He signalized his valour on many occasions, under the government of Judas and Jonathan, his brothers; and afterwards was called to the supreme command, by the unanimous voice of the nation. He fortified Jerusalem, and many other parts of Judæa. He sent ambassadors to Demetrius, who had succeeded Antiochus the younger in the kingdom of Syria, to solicit the re-establishment of the Jewish privileges, which were granted. He also made alliances with the Romans, and other states; and truly deserved the appellation of father of his people. He was basely murdered, with his two sons, by his relation Ptolemy, in the midst of a feast, B. C. 135.

SIMON MAGUS, or the Magician, chief of the Simoniacs, and Gnostics. He was a Samaritan, and baptized by Philip, but relapsing, pretended he was the son of God. He died miserably, A. D. 60.

SIMONEAU (Charles), an engraver, born at Orleans, about the year 1639. He was pupil to Noel Quipel, and died at Paris in 1728. He is particularly distinguished by the medals he engraved, to complete the medallic history of Louis the Great.

SIMO'NIAC. *s.* (*simoniaque*, Fr. *simoniacus*, Lat.) One who buys or sells preferment in the church (*Ayliffe*).

SIMONI'ACAL. *a.* (from *simoniac.*) Guilty of buying or selling ecclesiastical preferment (*Spectator*).

SIMONIDES, a celebrated poet of Cos, who flourished 538 years B. C. He wrote elegies, epigrams, and dramatical pieces, esteemed for their elegance and sweetness, and composed also epic poems, one on Cambyses king of Persia, &c. Simonides was universally courted by the princes of Greece and Sicily. He obtained a poetical prize in the 80th year of his

age, and he lived to his 90th year. The people of Syracuse erected a magnificent monument to his memory. Simonides, according to some, added the four letters η, ω, ξ, ψ, to the alphabet of the Greeks. Some fragments of his poetry are extant. They may be seen in Brunk's Analecta, in Stephens's Pindar, 1560, and in other editions of the ancient lyric poets.

SIMONIANS, in church history, a sect of ancient christians, so called from their founder, Simon Magus, or the magician. The heresies of Simon Magus were principally his pretending to be the great power of God, and thinking that the gifts of the Holy Ghost were venal.

SIMONTHORNA, a strong town of Lower Hungary, in the county of Tolna, with a castle. It was taken from the Turks in 1686, and is seated on the Sarwige, eight miles from Tolna. Lon. 18. 16 E. Lat. 46. 40 N.

SIMONY, is the corrupt presentation of any one to an ecclesiastical benefice, for money, gift, reward, or benefit.

By one of the canons of 1603, every person before his admission to any ecclesiastical promotion, shall, before the ordinary, take an oath, that he has made no simoniacal contract, promise, or payment, directly or indirectly, by himself or any other, for the obtaining of the said promotion: and that he will not afterwards perform or satisfy any such kind of payment, contract, or promise, by any other without his knowledge or consent.

To purchase a presentation, the living being actually vacant, is open and notorious simony; this being expressly in the face of the statute. Moor. 914.

The sale of an advowson, during a vacancy, is not within the statute of simony, as the sale of the next presentation is; but it is void by the common law. 2 Black. 22.

A bond of resignation is a bond given by the person intended to be presented to a benefice, with condition to resign the same, and is special or general. The condition of a special one is to resign the benefice in favour of some certain person, as a son, kinsman, or friend of the patron, when he shall be capable of taking the same. By a general bond, the incumbent is bound to resign on the request of the patron. 4 Bac. Abr. 470.

A bond with condition to resign within three months after being requested, to the intent that the patron might present his son when he should be capable, was held good; and the judgment was affirmed in the exchequer-chamber; for a man may, without any colour of simony, bind himself for good reasons, as if he takes a second benefice, or if he is non-resident, or that the patron presents his son, to resign; but if the condition had been to let the patron have a lease of the glebe or tithes, or to pay a sum of money, it would have been simoniacal.

SIMOOM. A wind or haze was observed by Mr. Bruce, in the course of his travels to discover the sources of the Nile, which is supposed to be in some respects analogous to the sirocco. It is called by Mr. Bruce the simoom, and from its effects upon the lungs we can entertain but little doubt that it consists chiefly of carbonic acid gass in a very dense state, and perhaps mixed with some other noxious exhalations.

In the same desert Mr. Bruce observed the astonishing phenomenon of moving pillars of sand, which are probably the effects of a number of whirlwinds in those torrid regions. As the description of these pillars is in some degree blended with that of the simoom, we shall extract the passage. In relating the particulars of his journey across a certain part of the deserts of Africa, Mr. Bruce observes, "We were here at once surprised and terrified by a sight surely one of the most magnificent in the world. In that vast expanse of desert, from west and to the north-west of us, we saw a number of prodigious pillars of sand at different distances, at times moving with great celerity, and at others stalking on with a majestic slowness; at intervals we thought they were coming in a very few minutes to overwhelm us; and small quantities of sand did actually more than once reach us. Again they would retreat so as to be almost out of sight, their tops reaching to the very clouds. There the tops often separated from the bodies; and these, once disjoined, dispersed in the air, and did not appear more. Sometimes they were broken near the middle, as if struck with a large cannon-shot. About noon they began to advance with considerable swiftness upon us, the wind being very strong at north. Eleven of them ranged along side of us about the distance of three miles. The greatest diameter of the largest appeared to me at that distance as if it would measure ten feet. They retired from us with a wind at south-east, leaving an impression upon my mind to which I can give no name, though surely one ingredient in it was fear, with a considerable deal of wonder and astonishment. It was in vain to think of flying; the swiftest horse, or fastest-sailing ship, could be of no use to carry us out of this danger; and the full persuasion of this rivetted me as if to the spot where I stood, and let the camels gain on me so much in my state of lameness, that it was with some difficulty I could overtake them."

To SI'MPER. *v. n.* (from ymbelan, Saxon, to keep holiday. *Skinner.*) To smile; generally to smile foolishly (*Sidney*).

SI'MPER. *s.* (from the verb.) Smile; generally a foolish smile (*Pope*).

SI'MPLE. *a.* (*simplex*, Latin; *simple*, Fr.) 1. Plain; artless; unskilled; undesigning; sincere; harmless (*Hooker*). 2. Uncompounded; unmingled; single; only one; plain; not complicated (*Watts*). 3. Silly; not wise; not cunning (*Proverbs*).

SIMPLE EQUATION, FRACTION, and SURD. See the substantives.

SIMPLE QUANTITIES, in algebra, are those that consist of one term only; as a, or $-ab$, or $3\,abc$. In opposition to compound quantities, which consist of two or more terms; as $a+b$, or $a \quad 2b-3ac$.

SIMPLE FLANK, and TENAILLE, in fortification. See the substantives.

SIMPLE MACHINE, MOTION, PENDULUM, and WHEEL, in mechanics. See the substantives.

The simplest machines are always the most esteemed. And in geometry, the most simple demonstrations are the best.

SIMPLE, in music, a term applied to that counterpoint in which note is set against note, and which is called simple, in opposition to more elaborate composition, known by the name of figurative counterpoint. Simple fugue, or simple imitation, is that style of composition in which a single subject is adopted, or some partial echo preserved amongst the several parts. This word in the music of the last age is frequently used in contradistinction to double, applied to variations, as double 1, double 2, &c. and signifies the plain motivo, or subject, on which the variations are founded. Simple cadence is that in which the notes are equal through all the parts. Simple concords are those wherein we hear only two notes in consonance; and simple intervals are those in which no parts or divisions are supposed, and which the ancient Greeks called *diastems*.

SIMPLE SOUND. A pure, unmixed, single sound. Some theorists will not allow that there is, musically speaking, any such sound in nature: but assert on the contrary that every sound which is produced is at least accompanied with its twelfth and seventeenth.

SI'MPLE. *s.* (*simple*, Fr.) A single ingredient in a medicine; a drug; an herb (*Temple*).

To SI'MPLE. *v. n.* To gather simples (*Garth*).

SI'MPLENESS. *s.* (from *simple*.) The quality of being simple (*Digby*).

SI'MPLER. *s.* (from *simple*.) A simplist; an herbalist.

SIMPLER'S JOY, in botany. See VERBENA.

SI'MPLESS. *s.* (*simplesse*, Fr.) Simplicity; silliness; folly: obsolete (*Spenser*).

SI'MPLETON. *s.* (from *simple*.) A silly mortal; a trifler; a foolish fellow (*L'Estrange*).

SIMPLI'CITY. *s.* (*simplicitas*, Latin.) 1. Plainness; artlessness; not subtilty; not cunning; not deceit (*Sidney*). 2. Plainness; not abstruseness (*Hammond*). 3. Plainness; not finery (*Dryden*). 4. Singleness; not composition; state of being uncompounded (*Brown*). 5. Weakness; silliness (*Hooker*).

SI'MPLIST. *s.* (from *simple*.) One skilled in simples (*Brown*).

SI'MPLY. *ad.* (from *simple*.) 1. Without art; without subtilty; plainly; artlessly (*Milton*). 2. Of itself; without addition (*Hooker*). 3. Merely; solely (*Hooker*). 4. Foolishly; sillily.

SIMPSON (Thomas), in biography, professor of mathematics at the Royal Academy at Woolwich, fellow of the Royal Society, and member of the Royal Academy, at Stockholm, was born at Market Bosworth, in Leicestershire, in 1710. His father, a stuff-weaver, taught him only to read English, and brought him up to his own business; but meeting with a scientific pedlar, who also practised fortune-telling, young Simpson, by his assistance and advice, left off weaving, and professed astrology. As he improved in knowledge, however, he grew disgusted with his pretended art, and, renouncing it, was driven to such difficulties for the subsistence of his family, that he came up to London, where he worked as a weaver, and taught mathematics at his spare hours. As his scholars increased, his abilities became better known, and he published his treatise on Fluxions, by subscription, in 1737; in 1740 he published his Treatise on the Nature and Laws of Chance; and Essay in Speculative and Mixed Mathematics. After these appeared his Doctrine of Annuities and Reversions; Mathematical Dissertations; Treatise on Algebra; Elements of Geometry; Trigonometry, Plane and Spherical; Select Exercises; and his Doctrine and Application of Fluxions, which he professes to be rather a new work, than a second edition of his former publication on fluxions. In 1743, he obtained the mathematical professorship at Woolwich Academy; and soon after was chosen a member of the Royal Society, when the president and council, in consideration of his moderate circumstances, were pleased to excuse his admission-fees, and his giving bonds for the settled future payments. At the Academy he exerted all his abilities in instructing the pupils, who were the immediate objects of his duty, as well as others whom the superior officers of the ordnance permitted to be boarded and lodged in his house. In his manner of teaching he had a peculiar and happy address, a certain dignity and perspicuity, tempered with such a degree of mildness, as engaged the attention, esteem, and friendship, of his scholars. He therefore acquired great applause from his superiors in the discharge of his duty.

Mr. Simpson's Miscellaneous Tracts, printed in 4to., 1757, were his last legacy to the public; a most valuable bequest, whether we consider the dignity and importance of the subjects, or his sublime and accurate manner of treating them.

The first of these papers is concerned in determining the precession of the equinoxes, and the different motions of the earth's axis, arising from the attraction of the sun and moon. It was drawn up about the year 1752, in consequence of another on the same subject, M. de Sylvabelle, a French gentleman. Though this gentleman had gone through one part of the subject with success and perspicuity, and his conclusions were perfectly conformable to Dr. Bradley's observations, it nevertheless appeared to Mr. Simpson, that he had greatly failed in a very material part, and that indeed the only very difficult one; that is, in the determination of the momentary alteration of the position of the earth's axis, caused by the forces of the sun and moon; of which forces,

the quantities, but not the effects, are truly investigated. The second paper contains the investigation of a very exact method or rule for finding the place of a planet in its orbit, from a correction of Bishop Ward's circular hypothesis, by means of certain equations applied to the motion about the upper focus of the ellipse. By this method the result, even in the orbit of Mercury, may be found within a second of the truth, and that without repeating the operation. The third shows the manner of transferring the motion of a comet from a parabolic orbit, to an elliptic one; being of great use, when the observed places of a (new) comet are found to differ sensibly from those computed on the hypothesis of a parabolic orbit. The fourth is an attempt to show, from mathematical principles, the advantage arising from taking the mean of a number of observations, in practical astronomy; wherein the odds, that the result in this way is more exact than from one single observation, is evinced, and the utility of the method in practice clearly made appear. The fifth contains the determination of certain fluents, and the resolution of some very useful equations, in the higher orders of fluxions, by means of the measures of angles and ratios, and the tight and versed sines of circular arcs. The sixth treats of the resolution of algebraical equations, by the method of surd-divisors; in which the grounds of that method, as laid down by sir Isaac Newton, are investigated and explained. The seventh exhibits the investigation of a general rule for the resolution of isoperimetrical problems of all orders, with some examples of the use and application of the said rule. The eighth, or last part, comprehends the resolution of some general and very important problems in mechanics and physical astronomy; in which, among other things, the principal parts of the third and ninth sections of the first book of Newton's Principia are demonstrated in a new and concise manner. But what may perhaps best recommend this excellent tract, is the application of the general equations, thus derived to the determination of the last orbit.

According to what Mr. Simpson had intimated at the conclusion of his Doctrine of Fluxions, the greatest part of this arduous undertaking was drawn up in the year 1750. About that time M. Clairaut, a very eminent mathematician of the French academy, had started an objection against Newton's general law of gravitation. This was a motive to induce Mr. Simpson (among some others) to endeavour to discover whether the motion of the moon's apogee, on which that objection had its whole weight and foundation, could not be truly accounted for, without supposing a change in the received law of gravitation, from the inverse ratio of the squares of the distances. The success answered his hopes, and induced him to look further into other parts of the theory of the moon's motion than he at first intended: but before he had completed his design, M. Clairaut arrived in England, and made Mr. Simpson a visit; from whom he learned, that he had a little before printed a piece on that subject, a copy of which Mr. Simpson afterwards received as a present, and found in it the same things demonstrated, to which he himself had directed his enquiry, besides several others.

The facility of the method Mr. Simpson fell upon, and the extensiveness of it, will in some measure appear from this, that it not only determines the motion of the apogee in the same manner, and with the same ease, as the other equations, but utterly excludes all those dangerous kind of terms that had embarrassed the greatest mathematicians, and would, after a great number of revolutions, entirely change the figure of the moon's orbit. From whence this importance is derived, that the moon's mean motion, and the greatest quantities of the several equations, will remain unchanged, unless disturbed by the intervention of some foreign or accidental cause. These tracts are inscribed to the earl of Macclesfield, president of the Royal Society.

Mr. Simpson's extreme application in this difficult pursuit greatly injured his health. Exercise and a proper regimen were prescribed to him, but to little purpose; for his spirits sunk gradually, till he became incapable of performing his duty, or even of reading the letters of his friends. The effects of this decay of nature were greatly increased by vexation of mind, owing to the haughty and insulting behaviour of his colleague, the professor of fortification. This person, greatly his inferior in mathematical accomplishments, did what he could to make his situation uneasy, and even to depreciate him in the public opinion; but it was a vain endeavour, and only served to injure himself. At length his physicians advised his native air for his recovery, and he set out in February, 1761; but was so fatigued by his journey, that upon his arrival as Bosworth he betook himself to his chamber, and grew continually worse till the day of his death, which happened on the 15th of May, in the 51st year of his age. For further particulars of this extraordinary man, see Dr. Hutton's life of him, prefixed to his Select Exercises.

SIMSON (Dr. Robert), in biography, professor of mathematics in the university of Glasgow, was born Oct. 14, 1687 of a respectable family, which had held a small estate in the county of Lanark for some generations. He was eldest son of the family. A younger brother was professor of medicine in the university of St. Andrew's, and is known by some works of reputation, particularly A Dissertation on the Nervous System, occasioned by the dissection of a brain completely ossified.

Dr. Simson was educated in the university of Glasgow under the eye of some of his relations who were professors. Eager after knowledge, he made great progress in all his studies; and as his mind did not, at the very first openings of science, strike into that path which afterwards so strongly attracted him, and in which

he proceeded so far almost without a companion, he acquired in every walk of science a stock of information, which, though it had never been much augmented afterwards, would have done credit to a professional man in any of his studies. He became, at a very early period, an adept in the philosophy and theology of the schools, was able to supply the place of a sick relation in the class of oriental languages, was noted for historical knowledge, and one of the most knowing botanists of his time. As a relief to other studies, he turned his attention to mathematics. Perspicuity and elegance he thought were more attainable, and more discernible in pure geometry, than in any other branch of the science. To this therefore he chiefly devoted himself; for the same reason he preferred the ancient method of studying pure geometry. He considered algebraic analysis as little better than a kind of mechanical knack, in which we proceed without ideas, and obtain a result without meaning, and without being conscious of any process of reasoning, and therefore without any conviction of its truth. Such was the ground of the strong bias of Dr. Simson's mind to the analysis of the ancient geometers. It increased as he advanced, and his veneration for the ancient geometry was carried to a degree of idolatry. His chief labours were exerted in efforts to restore the works of the ancient geometers. The inventions of fluxions and logarithms attracted the notice of Dr. Simson, but he has contented himself with demonstrating their truth on the genuine principles of ancient geometry.

So early as March 1711, Dr. Simson was chosen regius professor of mathematics in the university of Glasgow. He was in London at the time of his appointment, and there formed an acquaintance with the most eminent men of that bright era of British science. Among these he always mentioned captain Halley (the celebrated Dr. Edmund Halley) with particular respect; saying, that he had the most acute penetration, and the justest taste in that science, of any man he had ever known. And, indeed, Dr. Halley has strongly exemplified both of these in his divination of the work of Apollonius de Sectione Spatii, and the eighth book of his Conics, and in some of the most beautiful theorems of sir Isaac Newton's Principia. Dr. Simson also admired the wide and masterly steps which Newton was accustomed to take in his investigations, and his manner of substituting geometrical figures for the quantities which are observed in the phænomena of nature. It was from Dr. Simson that the late professor Robison learnt, "That the thirty-ninth proposition of the first book of the Principia was the most important proposition that had ever been exhibited to the physico-mathematical philosopher;" and he used always to illustrate to his more advanced scholars the superiority of the geometrical over the algebraic analysis, by comparing the solution given by Newton of the inverse problem of centripetal forces, in the forty-second proposition of that book, with the one given by John Bernoulli in the Memoirs of the Academy of Sciences at Paris for 1713. He had heard him say, that to his own knowledge Newton frequently investigated his propositions in the symbolical way; and that it was owing chiefly to Dr. Halley that they did not finally appear in that dress. But if Dr. Simson was well informed, we think it a great argument in favour of the symbolic analysis when this most successful practical artist (for so we must call Newton when engaged in a task of discovery) found it conducive either to dispatch or perhaps to his very progress. Returning to his academical chair, Dr. Simson discharged the duties of a professor for more than fifty years with great honour to the university and to himself. It is almost needless to say, that in his prelections he followed strictly the Euclidian method in elementary geometry. He made use of Theodosius as an introduction to spherical trigonometry. In the higher geometry he lectured from his own Conics; and he gave a small specimen of the linear problems of the ancients, by explaining the properties, sometimes of the conchoid, sometimes of the cissoid, with their application to the solution of such problems. In the more advanced class he was accustomed to give Napier's mode of conceiving logarithms, i. e. quantities as generated by motion; and Mr. Cotes's view of them, as the sums of ratiunculæ; and to demonstrate Newton's lemmas concerning the limits of ratios; and then to give the elements of the fluxionary calculus; and to finish his course with a select set of propositions in optics, gnomonics, and central forces. His method of teaching was simple and perspicuous, his enunciation clear, and his manners easy and impressive. He had the respect, and still more the affection, of his scholars.

It was chiefly owing to the celebrated Halley that Dr. Simson so early directed his efforts to the restoration of the ancient geometers. He had recommended this to him, as the most certain way for him, at that time very young, both to acquire reputation, and to improve his own knowledge and taste, and he presented him with a copy of Pappus's Mathematical collections, enriched with his own notes. Hence he undertook the restoration of Euclid's porisms, a work of such difficulty, that his biographer says nothing but success could justify in so young an adventurer. From this he proceeded to other works of importance, which he executed with so much skill, as to obtain the reputation of being one of the most elegant geometers of the age. His edition of Euclid's Elements has long been reckoned the very best that exists. Another work, on which Dr. Simson bestowed much labour, was the Sectio determinata, which was published after his death, by the late earl Stanhope, with the great work, The Porisms of Euclid. This nobleman had kept up a correspondence with Dr. Simson till his death in 1768, when he engaged Mr. Clow, to whose care the doctor had left his papers, to make a selection of such as would serve to support and increase his reputation, as

the restorer of ancient geometry. This selection lord Stanhope printed at his own expense.

"The life of a literary man rarely teems with anecdote; and a mathematician, devoted to his studies, is perhaps more abstracted than any other person from the ordinary occurrences of life, and even the ordinary topics of conversation. Dr. Simson was of this class; and, having never married, lived entirely a college life. Having no occasion for the commodious house to which his place in the university intitled him, he contented himself with chambers, good indeed, and spacious enough for his sober accommodation, and for receiving his choice collection of mathematical writers, but without any decoration or commodious furniture. His official servant sufficed for valet, footman, and chambermaid. As this retirement was entirely devoted to study, he entertained no company in his chambers, but in a neighbouring house, where his apartment was sacred to him and his guests. Having in early life devoted himself to the restoration of the works of the ancient geometers, he studied them with unremitting attention; and retiring from the promiscuous intercourse of the world, he contented himself with a small society of intimate friends, with whom he could lay aside every restraint of ceremony or reserve, and indulge in all the innocent frivolities of life. Every Friday evening was spent in a party at whist, in which he excelled, and took delight in instructing others, till increasing years made him less patient with the dulness of a scholar who had not aptness enough, or inclination, to excel in this *philosophical* amusement. In like manner, every Saturday he had a less select party to dinner at a house about a mile from town. The Doctor's long life gave him occasion to see the dramatis personæ of this little theatre several times completely changed, while he continued to give it a personal identity; so that, without any design or wish of his own, it became, as it were, his own house and his own family, and went by his name. Dr. Simson was of an advantageous stature, with a fine countenance; and even in his old age had a graceful carriage and manner, and always, except when in mourning, dressed in white cloth. He was of a cheerful disposition; and though he did not make the first advances to acquaintance, had the most affable manner, and strangers were at perfect ease in his company. He enjoyed a long course of uninterrupted health; but towards the close of life suffered from an acute disease, and was obliged to employ an assistant in his professional labours for a few years preceding his resignation, which was in 1761. His faculties, however, decayed very gradually; and he had only a few weeks illness before his death, which happened October 1, 1768, at the age of 81. He left to the university his valuable library, which is now arranged apart from the rest of the books, and the public use of it is limited by particular rules. It is considered as the most choice collection of mathematical books and manuscripts in the kingdom, and many of them are rendered doubly valuable by Dr Simson's notes. For a more particular account of the life and writings of this great man, the reader is referred to the interesting memoirs of him just published by his friend and pupil Dr. W. Trail, in a 4to volume; which contains also a valuable summary of Pappus's Collections, and much other curious and useful matter.

SI'MULAR. *s.* (from *simulo*, Latin.) One that counterfeits (*Shakspeare*).

SIMULA'TION. *s.* (*simulatio*, Lat.) That part of hypocrisy which pretends that to be which is not (*Bacon*).

SIMULTA'NEOUS. *a.* (*simultaneus*, Lat.) Acting together; existing at the same time (*Glanville*).

SIN. (ryn, Saxon.) 1. An act against the laws of God; a violation of the laws of religion (*Shakspeare*). 2. Habitual negligence of religion (*Watts*).

To SIN. *v. n.* (from the noun.) 1. To neglect the laws of religion; to violate the laws of religion (*Psalms*). 2. To offend against right (*Shakspeare*).

SINAI, a mountain of Arabia Petræa, in a peninsula formed by the two arms of the Red Sea. Here the law was given to Moses, for which reason the Mahometans hold it in great veneration; and here the Christians have a monastery, which formerly contained a great number of monks, and there were many little chapels and cells for hermits. The monastery is surrounded by a high wall, and those that go in and out are drawn up and let down in baskets. Lon. 34. 15 E. Lat. 29. 2 N.

SINAPIS. Mustard. In botany, a genus of the class tetradynamia, order siliquosæ. Silique beaked, with the valves shorter than the partition; gland between the shorter stamens and the pistil, and between the longer stamens and the calyx; calyx very much spread; corol with straight claws. Nineteen species, for the most part scattered over the warmer climates of the globe; the three following common to our hedges and fields.

1. S. arvensis. Charlock. Siliques many-angled; turgid at the seeds, longer than the two-edged beak; leaves ovate, somewhat lyrate. Found wild in our cornfields; the seeds of which are employed in the manufacture of what is called Durham mustard.

2. S. alba. White mustard. Siliques bristly, turgid at the seeds, shorter than the two-edged beak; leaves pinnatifid. Found wild in our cultivated fields; and also cultivated in our gardens as a salad-herb, to be eaten with cresses and radishes.

3. S. nigra. Black mustard. Siliques glabrous, square appressed to the common stalk; upper-leaves linear lanceolate, entire, glabrous. Found wild in our hedges. It is the flour of this seed that affords the common mustard at our tables.

The seeds of this species of mustard, which are directed by the London college, and those of the sinapis alba, which are preferred by that of Edinburgh, manifest no remarkable differ-

ence to the taste, nor in their effects, and therefore answer equally well for medicinal and culinary purposes. They have an acrid, pungent taste, and, when bruised, this pungency shows its volatility by powerfully affecting the organs of smell. Mustard is considered as capable of promoting appetite, assisting digestion, attenuating viscid juices, and, by stimulating the fibres, it proves a general remedy in paralytic affections. Joined to its stimulant qualities, it frequently, if taken in considerable quantity, opens the body, and increases the urinary discharge, and hence it has been found useful in dropsical complaints. Externally, flower of mustard is frequently used mixed with vinegar as a stimulant or sinapism

SINAPISM, in pharmacy, an external medicine, in form of a cataplasm, composed chiefly of mustard-seed pulverized, and other ingredients mentioned in the preceding article.

SINCE. *ad.* (formed by contraction from *sithence*, or *sith thence*, from ꝥðe, Saxon.) 1. Because that (*Locke*). 2. From the time that (*Pope*). 3. Ago; before this (*Sidney*).

SINCE. *preposition.* After; reckoning from some time past to the time present (*Dryden*).

SINCE'RE. *a.* (*sincerus*, Lat. *sincere*, Fr.) 1. Unhurt; uninjured (*Dryden*). 2. Pure; unmingled (*Atterbury*). 3. Honest; undissembling; uncorrupt (*Law*).

SINCE'RELY. *ad.* (from *sincere.*) Honestly; without hypocrisy (*Watts*).

SINCE'RENESS. SINCE'RITY. *s.* (*sincerité*, French; from *sincere.*) 1. Honesty of intention; purity of mind (*Rogers*). 3. Freedom from hypocrisy (*Pope*).

SINCIPUT, in anatomy, the forepart of the head, reaching from the fore-head to the coronal suture.

SINDELFINGEN, a town of Suabia, in the duchy of Wurtemberg, six miles S.W. of Stutgard, and 30 E. of Baden. Lon. 9. 5 E. Lat. 48. 45 N.

SINDY, or SCIND, a province of Hindustan Proper, bounded on the W. by Persia, on the N. by the territories of the king of Candahar, on the N.E. by those of the Seiks, on the E. by a sandy desert, and on the S.E. by Cutch. It extends along the course of the Indus, from its mouth, to the frontiers of Moultan, 300 miles; and its breadth, in the widest part, is 160. In soil and climate, and the general appearance of the surface, it resembles Egypt; the lower part being composed of rich vegetable mould, and extended into a wide dell; while the upper part is a narrow slip of country, confined on one side by a ridge of mountains, and on the other by a desert; the Indus, equal at least to the Nile, winding through the midst of this level valley, and annually overflowing it. During great part of the S.W. monsoon, or at least in July, August, and part of September (the rainy season in most other parts of India) the atmosphere is here generally clouded; but no rain falls, except near the sea. Owing to this, and the neighbourhood of the sandy deserts, on the E. and on the N.W. the heats are so violent, and the winds from those quarters so pernicious, that the houses are contrived so as to be occasionally ventilated by apertures on the top, resembling the funnels of small chimneys. When the hot winds prevail, the windows are closely shut, by which the hottest current of air, near the surface, is excluded; and a cooler part, because more elevated, descends into the house through the funnels. By this also vast clouds of dust are excluded; the entrance of which would alone be sufficient to render the houses uninhabitable. The roofs are composed of thick layers of earth instead of terraces. Few countries are more unwholesome to European constitutions, particularly the lower part of the Delta. The Hindus, who were the original inhabitants of Sindy, are treated with great rigour by their Mahometan governors, and are not permitted to erect any pagodas, or places of worship; and this severity drives vast numbers of them into other countries. The inland parts of Sindy produce saltpetre, sal ammoniac, borax, bezoar, lapis lazuli, and raw silk. Here are manufactures of cotton and silk of various kinds; and also of fine cabinets, inlaid with ivory, and finely lacquered. Great quantities of butter are exported, which is clarified and wrapt up in duppas, made of the hides of cattle. Here are large beeves, fine sheep, and small hardy horses. The wild game are deer, hares, antelopes, and foxes, which are hunted with dogs; also leopards, and a small fierce creature called a shiahgush. The prince of this province is tributary to the sultan of Candahar, and he chiefly resides at the fort of Hydrabad. Tatta is the capital.

SINE, or RIGHT SINE, of an arc, in trigonometry, a right line drawn from one extremity of the arc, perpendicular to the radius drawn to the other extremity of it: or, it is half the chord of double the arc.

CO-SINE, is the sine of the complement of an arc. So, if an arc be one of 40 degrees, its cosine will be the sine of an arc of 50 degrees.

SINE TOTAL, is the sine of 90 degrees, or of a quadrant; it is equal to the radius of the circle, and is, therefore, the greatest sine, whence its name.

VERSED SINE, is the part of the diameter intercepted between the foot of the sine and the arc.

The sum of the versed sine and the cosine is equal to the radius.

The sine, cosine, and versed sine, are usually denoted by the contractions sin. cos. versin.

The sine, cosine, and versed sine, of an arc, are also the same of an angle, or the number of degrees, &c. which it measures.

The sines, &c. of every degree and minute in a quadrant, are calculated to the radius 1, and ranged in tables for use. But because operations with these natural sines require much labour in multiplying and dividing by them, the logarithms of them are taken, and ranged in tables also; and these logarithmic sines are commonly used in practice, instead of the natural ones, as they require only additions and subtractions, instead of the multiplications and divisions.

The sines were introduced into trigonometry by the Arabians. And for the etymology of the word sine, see Introduction to Hutton's Loga-

rithms, pa. 17, &c. And the various ways of calculating tables of the sines may be seen in the same place, pa. 13, &c. also in the Doctor's Tracts, vol. I. just published. See likewise our article TRIGONOMETRY.

Let sine $=s$
Cosine $=a$
Versed sine $=v$
Radius $=r$
Chord $=c$

Then we have $r^2 = s^2 + a^2$
$c^2 = s^2 + v^2$
$r = v + a$ or $v - a$, according as the arc is acute or obtuse.

From which equations the following theorems are deduced, in which the upper of the double signs $\pm$ or $\mp$ belongs to the acute, and the under to the obtuse arc.

	data	Theorems.		data	Theorems.
1		$r = \sqrt{s^2 + a^2}$	16		$s = \sqrt{r^2 - a^2}$
2	s, a	$v = \sqrt{s^2 + a^2} \mp a$	17	a, r	$v = r \mp a$
3		$c = \sqrt{2s^2 + 2a^2 \mp 2a\sqrt{a^2 + s^2}}$	18		$c = \sqrt{2r^2 \mp 2ar}$
4		$r = \frac{s^2 + v^2}{2v}$	19		$s = \sqrt{\frac{c^2 - a^2 \pm a\sqrt{2c^2 + a^2}}{2}}$
5	s, v	$a = \frac{\pm s^2 \mp v^2}{2v}$	20	a, c	$v = \frac{\sqrt{2c^2 + a^2} \mp a}{2}$
6		$c = \sqrt{s^2 + v^2}$	21		$r = \frac{\sqrt{2c^2 + a^2} \pm a}{2}$
7		$a = \sqrt{r^2 - s^2}$	22		$s = \sqrt{2rv - v^2}$
8	s, r	$v = r \mp \sqrt{r^2 - s^2}$	23	r, v	$a = +r \mp v$
9		$c = \sqrt{2r^2 \mp 2r\sqrt{r^2 - s^2}}$	24		$c = \sqrt{2rv}$
10		$a = \frac{\pm 2s^2 \mp c^2}{2\sqrt{c^2 - s^2}}$	25		$s = \sqrt{c^2 - v^2}$
11	s, c	$v = \sqrt{c^2 - s^2}$	26	v, c	$a = \frac{\pm c^2 \mp 2v^2}{2v}$
12		$r = \frac{c^2}{2\sqrt{c^2 - s^2}}$	27		$r = \frac{c^2}{2v}$
13		$s = \sqrt{v^2 \pm 2av}$	28		$s = \frac{c}{2r}\sqrt{4r^2 - c^2}$
14	a, v	$r = v \pm a$	29	r, c	$a = \frac{\pm 2r^2 \mp c^2}{2r}$
15		$c = \sqrt{2v^2 \pm 2av}$	30		$v = \frac{c^2}{2r}$

Again let s and c be the sine and cosine of an arc a. Then, it is known that $s = a - \frac{a^3}{2 \cdot 3r^2} + \frac{a^5}{2 \cdot 3 \cdot 4 \cdot 5r^4} - \frac{a^7}{2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7r^6}$ &c. $a = s + \frac{s^3}{2 \cdot 3r^2} + \frac{1 \cdot 3s^5}{2 \cdot 4 \cdot 5r^4} + \frac{1 \cdot 3 \cdot 5s^7}{2 \cdot 4 \cdot 6 \cdot 7r^6}$ &c.

Log. s = log. $a - M\left(\frac{a^2}{6} + \frac{a^4}{180} + \frac{a^6}{2835} + \frac{a^8}{37800}\right.$ &c.)

or Log. $s = -\frac{1}{2}M\left(c^2 + \frac{1}{2}c^4 + \frac{1}{3}c^6 + \frac{1}{4}c^8\right.$ &c.)

or Log. $s = -2M\left(z + \frac{1}{3}z^3 + \frac{1}{5}z^5 + \frac{1}{7}z^7\right.$ &c.)

where $z = \frac{1 - s}{1 + s}$, radius 1, and $M = .43429448$ &c.

If A be any other arc, S its sine, and C its cosine. Then

Sin. $(A + a) = \frac{Sc + sC}{r}$. Cos. $(A + a) = \frac{Cc - Ss}{r}$.

Sin. $(A - a) = \frac{Sc - sC}{r}$. Cos. $(A - a) = \frac{Cc + Ss}{r}$.

$\sin. A \times \cos. a = \frac{1}{2} \sin. (A-a) + \frac{1}{2} \sin. (A+a.)$

$\sin. A \times \sin. a = \frac{1}{2} \cos. (A-a) - \frac{1}{2} \cos. (A+a.)$

$$\text{Cos. } A \times \cos. a = \cos. \frac{A-a}{2} + \cos. \frac{A+a}{2}.$$

If $h = 2{\cdot}718281828$, &c. the number whose hyp. log. is 1; then

$$\text{Sin. } a = s = \frac{h^{a\sqrt{-1}} - h^{-a\sqrt{-1}}}{2\sqrt{-1}}.$$

$$\text{Cos. } a = c = \frac{h^{a\sqrt{-1}} + h^{-a\sqrt{-1}}}{2}.$$

See many other curious expressions of this kind in Bougainville's Calcul Integral, in Bertrand's Mathematics, Euler's Analysis Infinitorum, Legendre's Trigonometrie, Francœur's Mathematiques Pures, &c.

From some of the foregoing theorems the sines of a great variety of angles, or number of degrees, may be computed. Ex. gr. as below.

Angles.	*Sines.*
90°	r
75	$\frac{1}{2}r\sqrt{2+\sqrt{3}} = r \times \frac{\sqrt{6}+\sqrt{2}}{4}$
72	$\frac{1}{2}r\sqrt{\frac{5+\sqrt{5}}{2}} = \frac{1}{4}r\sqrt{10+2\sqrt{5}}$
67½	$\frac{1}{2}r\sqrt{2+\sqrt{2}}$
60	$\frac{1}{2}r\sqrt{3}$
54	$\frac{1}{2}r\sqrt{\frac{3+\sqrt{5}}{2}} = r \times \frac{\sqrt{5}+1}{4}$
45	$\frac{1}{2}r\sqrt{2}$
36	$\frac{1}{2}r\sqrt{\frac{5-\sqrt{5}}{2}} = \frac{1}{4}r\sqrt{10-2\sqrt{5}}$
30	$\frac{1}{2}r$
22½	$\frac{1}{2}r\sqrt{2-\sqrt{2}}$
18	$\frac{1}{2}r\sqrt{\frac{3-\sqrt{5}}{2}} = r \times \frac{\sqrt{5}-1}{4}$
15	$\frac{1}{2}r\sqrt{2-\sqrt{3}} = r \times \frac{\sqrt{6}-\sqrt{2}}{4}$

Radius being 1. Then for multiple arcs: the sin. $(n+1)\,a = 2c \times \sin. na - \sin. (n-1)\,a$ and cos. $(n+1)\,a = 2c \times \cos. na - \cos. (n-1)\,a$.

That is multiplying any sine or cosine by $2c$, and the next preceding sine or cosine subtracted from it, it gives the next following sine or cosine. Hence

sin. $0a = 0$,	cos. $0a = 1$ or radius.
sin. $a = s$.	cos. $a = c$.
sin. $2a = 2sc$.	cos. $2a = c^2 - s^2$.
sin. $3a = 3sc^2 - s^3$.	cos. $3a = c^3 - 3cs^2$.
sin. $4a = 4sc^3 - 4s^3c$.	cos. $4a = c^4 - 6c^2s^2 + s^4$
sin. $5a = 5sc^4 - 10s^3c^2 + s^5$, &c.	cos. $5a = c^5 - 10c^3s^2 + 5cs^4$, &c.

See TRIGONOMETRY.

SI'NECURE. *s.* (*sine*, without, and *cura*, care, Latin.) An office which has revenue without any employment (*Garth*).

SI'NEW. (ɾenpe, Saxon; *senewen*, Dutch.) 1. A tendon; the ligaments by which the joints are moved (*Dryden*). 2. Whatever gives strength or compactness; as, *money is the sinews of war* (*Dryden*). 3. Muscle or nerve (*Davies*).

To SI'NEW. *v. a.* (from the noun.) To knit, as by sinews: not in use (*Shakspeare*).

SINEW-SHRUNK, a term applied by farriers to a horse that is over-ridden, and so worn down with fatigue, that he becomes gaunt-bellied, as it is called, through a contraction of the two sinews that are under his belly. See the article BELLY.

SINEW-SPRUNG, a name given by old farriers to a violent over-reach, in which a horse strikes the toe of his hinder foot against the sinew of the fore-leg. See the article ATTAINT, &c.

SI'NEWED. *a.* (from *sinew.*) 1. Furnished with sinews (*Dry.*). 2. Strong; firm; vigorous.

SI'NEWY. *a.* (from *sinew.*) 1. Consisting of a sinew; nervous (*Donne*). 2. Strong; nervous; vigorous; forcible (*Shakspeare*).

SI'NFUL. *a.* (*sin* and *full.*) 1. Alien from God; not holy; unsanctified (*Milton*). 2. Wicked; not observant of religion; contrary to religion (*South*).

SI'NFULLY. *ad.* Wickedly; not piously; not according to the ordinance of God (*South*).

SI'NFULNESS. *s.* (from *sinful.*) Alienation from God; neglect or violation of the duties of religion; contrariety to religious goodness.

To SING. *v. n.* pret. *I sang* or *sung*; part. pass. *sung.* (ɾingan, Saxon; *singia*, Islandic; *singhen*, Dutch.) 1. To form the voice to melody; to articulate musically (*Dryden*). 2. To utter sweet sounds inarticulately (*Bacon*). 3. To make any small or shrill noise (*Pope*). 4. To tell in poetry (*Prior*).

To SING. *v. a.* 1. To relate or mention in poetry (*Milton*). 2. To celebrate; to give praises to, in verse (*Addison*). 3. To utter melodiously (*Shakspeare*).

SIN-GAN, a city of China, capital of the province of Chen-si, and the largest and most beautiful in the empire next to Peking. In its territories (which contain six cities of the second, and 31 of the third class) bats of a singular species are found; they are as large as domestic fowls, and the Chinese prefer their flesh to that of chicken. The walls of this city are 12 miles in circuit, nearly a square, and surrounded by a deep ditch; they are well fortified with towers, and some of the gates are very lofty and magnificent. It has a great trade, especially in mules, which are bred up in great numbers and sent to Peking. Here is a strong garrison of Tartars in a separate quarter of the city, from which it is parted by a strong wall. There are a great number of mandarins here, who are mostly Tartars. It is 540 miles S.W. of Peking. Lon. 148. 44 E. Lat. 34 16. N.

To SINGE. *v. a.* (ɾænzan, Saxon; *senghen*, Dutch.) To scorch; to burn slightly or superficially (*L'Estrange*).

SI'NGER. *s.* (from *sing.*) One that sings; one whose profession or business is to sing.

SINGING. The art of producing with the voice the sounds of any melody, together with the words to which that melody is set. To perform this with justness and felicity of effect, a fine voice, sensible ear, great natural taste

and considerable knowledge in the science of music, are indispensable requisites. From the voice itself all must be drawn in respect of sweetness, power, and modulation, of which by practice it is capable, while judgment, sense, and feeling, dictate the graces, accent, and expression.

SI'NGINGMASTER. *s.* (*sing* and *master.*) One who teaches to sing (*Addison*).

SI'NGLE. *a.* (*singulis*, Latin.) 1. One; not double; not more than one. 2. Particular; individual (*Pope*). 3. Not compounded (*Watts*). 4. Alone; having no companion; having no assistant (*Denham*). 5. Unmarried (*Dryden*). 6. Not complicated (*Bacon*). 7. Pure: uncorrupt; not double minded; simple. A scriptural sense (*Matthew*). 8. That in which one is opposed to one; as, single *combat*.

To SI'NGLE. *v. a.* (from the adjective.) 1. To choose out from among others (*Milton*). 2. To sequester; to withdraw (*Hooker*). 3. To take alone (*Hooker*). 4. To separate.

SINGLE FLOWER, in botany. Unicus flos. Only one on a stem, as in the tulip; opposed to many.—In common language, it is used in opposition to a double or monstrous flower.

SI'NGLENESS. *s.* (from *single.*) 1. Not duplicity or multiplicity; the state of being only one. Simplicity; sincerity; honest plainness.

SI'NGLY. *ad.* (from *single.*) 1. Individually; particularly (*Taylor*). 2. Only; by himself (*Shakspeare*). 3. Without partners or associates (*Pope*). 4. Honestly; simply; sincerely.

SI'NGULAR. *a.* (*singulier*, French; *singularis*, Latin.) 1. Single; not complex; not compound (*Watts*). 2. (In grammar.) Expressing only one; not plural (*Locke*). 3. Particular; unexampled (*Denham*). 4. Having something not common to others (*Tillot.*). 5. Alone; that of which there is but one.

SINGULAR POINTS, in the higher geometry, points in curves of the sublimer order in which something peculiar occurs; as nodes, cusps, points of inflection, of decussation, of retrogression, &c. The latter again, that is points of retrogression, are of two kinds; when the two branches of the curve both turn their convexity to the axis but on different sides of it; and when they both turn their convexities to the axis on the same side of it: curves of the former kind are called ceratoids (from their resemblance to diverging horns), those of the latter ramphoids (from their resemblance to the beaks of birds).

SINGULA'RITY. *s.* (*singularité*, French.) 1. Some character or quality by which one is distinguished from others (*Raleigh*). 2. Any thing remarkable; a curiosity; uncommon character or form (*Shakspeare*). 3. Particular privilege or prerogative (*Hooker*). 4. Character or manners different from those of others.

To SI'NGULARIZE. *v. a.* (*se singulariser*, Fr.) To make single.

SI'NGULARLY. *ad.* (from *singular.*) Particularly; in a manner not common to others (*South*).

SINGULTUS. Hickup. A convulsive motion of the diaphragm and parts adjacent.

SINIGAGLIA, a strong seaport of Italy, in the duchy of Urbino, with a castle and two harbours. It is the see of a bishop, and contains several fine churches and convents, and a mint. An annual fair is held here from the middle to the end of July, frequented by merchants from distant parts. It stands at the mouth of the Nigola, in the gulf of Venice, 17 miles S.E. of Pesaro. Lon. 13. 15 E. Lat. 43. 43 N.

SI-NING, a city of China, of the second rank, in the western extremity of the province of Chen-si. It has a considerable trade with the Tibetians, particularly in tea, and is 450 miles W.N.W. of Sin-gan. Lon. 101. 35 E. Lat. 36. 45 N.

SI'NISTER. *a.* (*sinister*, Latin.) 1. Being on the left hand; left; not right; not dexter (*Dryden*). 2. Bad; perverse; corrupt; deviating from honesty; unfair (*South*). 3. Unlucky; inauspicious. (*sinistre*, Fr.) The accent on the second syllable (*Ben Jonson*).

SI'NISTROUS. *a.* (*sinister*, Lat.) Absurd; perverse; wrongheaded (*Bentley*).

SI'NISTROUSLY. *ad.* (from *sinistrous.*) 1. With a tendency to the left (*Brown*). 2. Perversely; absurdly.

To SINK. *v. n.* pret. *I sunk*, anciently *sank*; part. *sunk* or *sanken.* (rencan, Saxon; *senken*, German.) 1. To fall down through any medium; not to swim; to go to the bottom (*Milton*). 2. To fall gradually (2 *Kings*). 3. To enter or penetrate into any body (*Sam.*). 4. To lose height; to fall to a level (*Addison*). 5. To lose or want prominence (*Dryden*). 6. To be overwhelmed or depressed (*Milton*). 7. To be received; to be impressed (*Locke*). 8. To decline; to decrease; to decay (*Addison*). 9. To fall into rest or indolence (*Addison*). 10. To fall into any state worse than the former; to tend to ruin (*Dryden*).

To SINK. *v. a.* 1. To put under water; to disable from swimming or floating (*Bacon*). 2. To delve; to make by delving (*Boyle*). 3. To depress; to degrade (*Prior*). 4. To plunge into destruction (*Shakspeare*). 5. To make to fall (*Woodward*). 6. To bring low; to diminish in quantity (*Addison*). 7. To crush; to overbear; to depress (*Pope*). 8. To diminish; to degrade (*Rogers*). 9. To make to decline (*Rowe*). 10. To suppress; to conceal (*Swift*).

SINK. *s.* (rinc, Saxon.) 1. A drain; a jakes (*Shakspeare*). 2. Any place where corruption is gathered (*Ben Jonson*).

SINKING FUND, in political economy, a portion of the public revenue appropriated to the reduction or discharge of the public debt. As the funding system had been adopted in other countries long before it was resorted to in Great Britain, a provision of this kind had appeared necessary at a much earlier period, and had been established in Holland in 1655, and in the ecclesiastical state in 1685. These funds were both formed by reducing the interest payable on the public debts, and appropriating the annual sum thus saved to the gradual discharge of the principal.

In the reign of king William, when the mode of providing for extraordinary expences by incurring public debts, which has become

so general, was first adopted in this country, the particular tax on which money was borrowed, generally produced much more than sufficient to pay the annual interest, and the surplus was applied in sinking or discharging the principal, which was generally effected in a few years. Had this plan been pursued, there never could have been any very great accumulation of public debts; but, as the expenditure increased, and the necessity of loans of still greater amount became more frequent, it was found sufficiently difficult to provide effectually for the yearly interest of the sums thus borrowed; and the repayment of the principal was either put off to a distant period, or left without any provision, to the chance of more flourishing times.

Some of the effects of accumulating public debts soon became evident; and the necessity was seen of confining them within moderate bounds; and among others, the plan of such a sinking fund as was afterwards actually established was clearly laid down in a pamphlet, entitled, A Letter to a Member of the late Parliament concerning the Debts of the Nation, published in 1701. In 1713, Mr. A. Hutcheson presented to the king a plan for payment of the public debts. In 1715, different projects for this purpose were published by Edward Leigh, Mr. Asgill, and others. And, in 1716, a plan for the gradual discharge of the debt was actually adopted, which was afterwards generally known by the appellation of the sinking fund. Sir Robert Walpole claimed great merit as the father of this fund, though it certainly required very little knowledge or invention to copy a plan which had been found successful in other countries, and which had been publicly recommended many years before; but whatever claims sir R. Walpole might have to the formation of the plan, he indisputably has all the disgrace of having perverted and destroyed it. The act by which it was established was worded as strong as possible, and expressly ordained, that the fund should be applied to the discharge of the public debts, and to no other use or purpose whatsoever; but, in 1722, it was made a collateral security for the interest of a million raised on exchequer bills, which prepared the way for more direct encroachments. In 1724, a sum was taken from the fund to make good the loss to the treasury from the reduction of the value of gold coin; and in 1727 the whole produce of the civil list revenues were settled on the king, by which the sinking fund was deprived of about 100,000*l.* per annum, to which the surplus of these revenues had usually amounted. In 1733 the gross sum of half a million was taken from the fund towards the current supplies, at which time the medium annual produce of the fund for five years had been 1,212,000*l.* but the alienation of it being continued by charging it with the interest of new loans, taking sums from it towards the supplies, and even anticipating its produce, little progress was made in the reduction of the debt, and at length the sinking fund became a mere nominal distinction.

The ruinous tendency of a continual accumulation of public debts was strongly pointed out by various writers on subjects of policy and finance; but by none with more zeal and ability than the late Dr. Price, who, about the year 1769, offered to the public some observations on the national debt, in the third chapter of his Observations on Reversionary Payments, in which he particularly recommended the establishment of a permanent sinking fund, on the principle of that established by sir Robert Walpole, but of which the efficacy had been so soon destroyed. In 1771, in an Appeal to the Public on the Subject of the National Debt, he showed that the best scheme for paying off the debt, was that which had long been known, which had been adopted, but unhappily crushed in its infancy; and in 1773, in the preface to the third edition of his Treatise on Reversionary Payments, he took the opportunity of again enforcing the necessity of restoring the plan formerly established, and securing it from future perversion. This advice was repeatedly urged on subsequent occasions; and in 1785, when Mr. Pitt was deliberating on the best means of establishing a new sinking fund, he particularly sought the advice and assistance of Dr. Price, who communicated three plans, which appeared to him the best adapted for carrying into execution a measure he had so long and so earnestly recommended. It was one of the three plans thus communicated which was afterwards adopted; but with some alterations which considerably affected its efficacy, and which it has since been found necessary to correct.

By the act passed in 1786, for establishing the new sinking fund, the annual sum of one million was placed in the hands of commissioners, who are, the speaker of the house of commons, the chancellor of the exchequer, the master of the rolls, the accomptant-general of the court of chancery, and the governor and deputy governor of the Bank of England for the time being respectively. This million was to be issued in four equal quarterly payments, and to be applied either in paying off such redeemable annuities as shall be at or above par, in such manner as may be directed by future acts of parliament, or in the purchase of annuities below par at the market price. The dividends on the sums redeemed or purchased, with the annuities for lives or terms of years that fall in or expire, and the sums which may be saved by any reduction of interest, were to be added to the fund, which, according to the original act, was to continue thus increasing till it amounted to four millions per annum; which it was then computed would be about the year 1812, when upwards of fifty-six millions of stock would be redeemed. From this time the dividends on such capital as should in future be paid off or purchased by the commissioners, with such annuities as might afterwards fall in, were to be at the disposal of parliament.

The commissioners were directed by the act to make their purchases "in equal portions, as nearly as may be, on every day (Saturdays

and Mondays excepted) on which the same shall be transferable." They were empowered to subscribe towards any public loan, to be raised by act of parliament, upon perpetual annuities, subject to redemption at par; and an account of the sums issued to them, and of the stock purchased to the first of February in every year, was directed to be annually laid before parliament, on or before the 15th of February. The purchases at first were all made in the 3 per cents, probably with the view of redeeming the 5 per cents, if the state of the public funds shoulds render such a measure practicable, or of inducing the proprietors to agree to a reduction of the interest at the time when they would become redeemable.

On the 17th February, 1792, the minister proposed, for the purpose of accelerating the operation of the fund, that the sum of 400,000*l.* should be issued in addition to the annual million; and stated, that, in consequence of this and future intended additions, it might be expected that twenty-five millions of 3 per cents, would be paid off by the year 1800: and that in the year 1808 the fund would have arisen to four millions per annum, being the sum to which it was restricted by the original act. The accumulation, however, was not to cease till the interest of the capital discharged, and the amounts of expired annuities, should, together with the annual million only, and exclusive of the proposed additions, amount to four millions. But the most important improvement was a provision, that, whenever in future any sums shall be raised by loans, on perpetual redeemable annuities, a sum, equal to one per cent. on the stock created by such loans, should be issued out of the produce of the consolidated fund quarterly, to be placed to the account of the commissioners; and if the loan, or any part, is raised by annuities, for a longer term than forty-five years, or for lives, a computation is to be made, of what will be at the end of forty-five years, the actual value of such part of the annuities as may be then outstanding, and the sum to be placed to the account of the commissioners is to be equal to one per cent. on this computed future value. By this means the immediate progress of the fund was accelerated, and future loans were put into a regular course of redemption.

This appropriation of one per cent. was to form a distinct fund; and a separate account was directed to be kept of the progress of each fund, by which it appeared, that on the first of February, 1802, the original fund had increased to 2,534,187*l.* 1*s.* 9*d.* and the new fund to 3,275,143*l.* 2*s.* 3*d.* It was now deemed expedient to unite the two funds, and to apply the whole amount indiscriminately to the reduction of the total debt. With this view, the former injudicious limitation of a fund established professedly on the principle of compound interest was done away; and the usual annual grant of 200,000*l.* per annum was made a permanent charge upon the consolidated fund; and the whole amount of the sinking fund was directed to be regularly applied to the purchase or redemption of stock, "so as that the whole of the several redeemable public annuities, now charged upon the public funds of Great Britain, shall be paid off within forty-five years from the respective periods of the creation of such respective charges and public annuities."

Stock bought up by the Commissioners for the Reduction of the National Debt, from the 1st of August 1786 to the 1st of February 1808.

	L.	*s.*	*d.*
Consolidated 3 per cents.	57,123,000	0	0
Reduced 3 per cents.	65,029,628	0	0
Old and New South-Sea annuities	6,901,000	0	0
3 per cent. annuities 1751	753,000	0	0
Consolidated 4 per cent. annuities	2,617,400	0	0
Consolidated 5 per cent. annuities	142,000	0	0
Imperial 3 per cent. annuities	829,426	0	0
Total of debt redeemed	*L.* 133,395,454	0	0

State of the Sinking Fund on 1st of February 1808.

Annual sum per act of 1786				1,000,000	0	0
Ditto per act of 1802				200,000	0	0
Annuities for 96 and 99 years, expired				54,880	14	6
Annuities for 10 years, expired				25,000	0	0
Expired and unclaimed life annuities				49,786	18	1
One per cent. on the capitals created since the 5th of January 1793				4,007,558	17	1
Appropriation on loan of 1807				646,752	5	4½
Dividend on *L.* 129,886,565	0	0	Three per cent stock	3,896,596	18	11½
Ditto on 2,617,400	0	0	Four per cent. stock	104,696	0	0
Ditto on 142,000	0	0	Five per cent. stock	7,100	0	0
Total fund				*L.* 9,992,371	14	0

The progress already made by the fund, and the important effect it has had in supporting the value of the government securities at a time when it has been necessary to borrow unprecedented sums in almost every year, sufficiently demonstrate the great utility of this measure. As its increase will be continually augmenting, it would, if steadily persevered in, and faithfully applied, become ultimately capable of discharging a debt of any amount which it is possible to suppose the country will ever be encumbered with.

It has been shewn that the fund, including the provision for the reduction of the debt in Ireland funded in Great Britain, and for the imperial loans, amounts at present to upwards of nine millions per annum; and as the stock has been bought up at little more than 60 per cent. the money has been improved at nearly 5 per cent. interest. It is neither desirable, nor to be expected, that it will always be possible to invest the produce of the fund at this rate of interest; but it may be shewn, that if the fund were never diverted from its purpose, its effects would in time be almost omnipotent, particularly when it is considered that the following sums are money, and consequently much less than the nominal capital of stock that would be bought up at any of the current prices at which these securities have been for many years past.

Amount to which the sinking fund of eight millions per annum would accumulate, if improved at 4 or 5 per cent. compound interest.

	4 per cent.	5 per cent.
Years.	Millions.	Millions.
In 1810	33	34
1820	146	156
1830	312	356
1840	558	680
1850	923	1209
1860	1463	2070
1870	2261	3472
1880	3443	5757
1890	5193	9478
1900	7782	15540

SI'NLESS. *a.* (from *sin.*) Exempt from sin (*Rogers*).

SI'NLESSNESS. *s.* (from *sinless.*) Exemption from sin (*Boyle*).

SI'NNER. *s.* (from *sin.*) 1. One at enmity with God; one not truly or religiously good (*South*). 2. An offender; a criminal (*Pope*).

SINNET, on board a ship, a line or string made of rope-yarn, consisting generally of two, six, or nine strings, which are divided into three parts, and are platted over one another, and then beaten smooth and flat with a wooden mallet. Its use is to save the ropes, or to keep them from galling.

SINOFFERING, an expiation or sacrifice for sin.

SINON, a son of Sisyphus, who accompanied the Greeks to the Trojan war, and there distinguished himself by his cunning and his intimacy with Ulysses. When the Greeks had fabricated the famous wooden horse, Sinon went to Troy with his hands bound behind his back, and by the most solemn protestations assured Priam, that the Greeks were gone from Asia, and that he had fled away from their camp, not to be cruelly immolated, for the purpose of rendering the wind propitious for their return. These false assertions were credited, and Sinon advised Priam to bring into his city the wooden horse, and to consecrate it to Minerva. His advice was followed; and to complete his perfidy, he opened in the night the side of the horse, from which issued a number of armed Greeks, who surprised the Trojans, and pillaged their city.

SINOPLE, in mineralogy, a species of unmagnetic iron. See FERRUM.

SINOVIA. See SYNOVIA.

To SI'NUATE. *v. a.* (*sinuo*, Lat.) To bend in and out (*Woodward*).

SINUA'TION. *s.* (from *sinuate.*) A bending in and out (*Hale*).

SINUO'SITY. *s.* (from *sinuous.*) The quality of being sinuous.

SI'NUOUS. *a.* (*sinuux*, Fr. from *sinus*, Latin.) Bending in and out (*Brown*).

SINUS. *s.* (Latin.) 1. A bay of the sea; an opening of the land (*Burnet*). 2. Any fold or opening.

SINUS. A cavity or depression.

SINUS GENÆ PITUITARIUS. See ANTRUM OF HIGHMORE.

SINUS LONGITUDINAL. See LONGITUDINAL SINUS.

SINUSES. The veins of the dura mater are so termed. They are several in number, the principal of which are, 1. the longitudinal sinus, which rises anteriorly from the crista galli, ascends and passes between the laminæ of the falciform process to where this process ends. It then opens into, 2. two lateral sinuses, distinguished into right and left, which lie in the crucial spine of the os occipitis: 3. the inferior longitudinal, which is a small sinus situated at the acute inferior margin of the falx.

SINUSES LATERAL. See LATERAL SINUSES.

SION, a mountain of Palestine, on the S. side of Jerusalem, of great celebrity in sacred history.

SION, or SITTEN, a town of Swisserland, capital of Valais, and an episcopal see. It is situate on the river Sitten, near the Rhone, at the foot of three insulated rocks, which rise immediately from the plain. On the highest, called Tourbillon, is the old deserted episcopal palace; on the second, denominated Valeria, are the remains of the old cathedral, and a few houses belonging to the canons; on Majoria, the third rock, stands the present episcopal palace. Sion was formerly the capital of the Seduni, and some Roman inscriptions still remain. It is 50 miles E. of Geneva. Lon. 7. 22 E. Lat. 46. 9 N.

To SIP. *v. a.* (ɾipan, Saxon; *sippen*, Dutch.)

1. To drink by small draughts (*Pope*). 2. To drink in small quantities (*Milton*). 3. To drink out of (*Dryden*).

To SIP. *v. n.* To drink a small quantity.

SIP. *s.* (from the verb.) A small draught; as much as the mouth will hold (*Milton*).

SIPHILIS. (from σιφλος, filthy or foul, i. e. the foul-disease, or συν and φιλη, amatory intercourse.) *Lues venerea*: *morbus gallicus*: venereal disease; French-pox. This word is generally, but, perhaps erroneously, written *syphilis*, as though from the latter derivation. It contains a genus of disease in the class cachexiæ and order impetigines of Cullen. Towards the close of the memorable fifteenth century, about the year 1494 or 1495 the inhabitants of Europe were greatly alarmed by the sudden appearance of lues venerea. The novelty of its symptoms, and the wonderful rapidity with which it was propagated throughout every part of the known world, soon made it an important object of medical enquiry.

It is now pretty well ascertained that this disease was brought by the ships-crews of Columbus from Hispaniola, or St. Domingo, as it is now called, at which island he touched in his return home from the discovery of America; by these sailors it was communicated to the women of the Spanish army that was on its march towards Italy, in consequence of the war that then prevailed; and through the medium of these women it soon extended equally to the Neapolitan and to the French soldiers, among whom, in consequence of their greater libidinousness, it made greater havoc than among the Spaniards; and hence acquired the name indiscriminately of Neapolitan and French pox.

1. In the common language, it is said a person is poxed, injured, or infected with the venereal disease, pox, or bad distemper, when the venereal poison has been received into, or is diffused through, the system, and there produces its peculiar effects. These effects or symptoms are ulcers of the mouth, fauces, spots, tetters, and ulcers of the skin, pains, swelling, and caries of the bones, &c. But as long as the effects of poison are local and confined to or near the genitals, the disorder is not called siphilis, lues venerea, or pox; but distinguished by some particular name according to its different seat or appearance; such as clap, shanker, bubo, &c. Concerning the nature of the venereal poison we know no more than we do about that of the small-pox or any other contagion; we know only that it produces peculiar effects, which yield to a peculiar mode of treatment. The smallest particle of this poison is sufficient to bring on the most violent disorder over the whole body.

2. It seems to spread and diffuse itself by a kind of fermentation and assimilation of matter; and, like other contagions, it requires some time after being applied to the human body before it produces that effect. It is not known whether it has different degrees of acrimony and volatility, or whether it is always the same in its nature, varying only with regard to the particular part to which it is applied, or according to the different habit and constitution, or particular idiosyncrasy of the person who receives the infection. We know that mercury possesses a certain and specific power of destroying the venereal virus; but we are quite uncertain whether it acts by a sedative, astringent, or evacuant quality; or if not, perhaps, rather by a chemical elective attraction, whereby both substances uniting with one another are changed in a third, which is no more hurtful, but has some new properties entirely distinct from those which any of them had before they were united. The variolous miasma, we know, produces its effects in about twenty or twenty-four days after the infection is received from the atmosphere, and eight or ten days if by inoculation, but the venereal virus seems to keep no particular period. At some times, and perhaps in particular persons, Dr. Swediaur has seen shankers arise in the space of twelve hours, nay in a still shorter time; indeed he mentions in a few minutes after an impure coition, whereas in most cases, they make their appearance only in as many days. The generality of men feel the first symptoms of a clap between the second and fifth day after an impure coitus; but there are instances where they do not appear till after as many weeks or months. We have known a young man who was seized with a violent discharge from the glans along with a phymosis, but without any shankers, four weeks after coition; and during all the intervals he felt not the least symptom of the disease. Some years ago, a gentleman went out from London in seemingly perfect health, to the East Indies; but on his arrival in that hot climate, after a voyage of four months, a violent clap broke out before he went on shore, though he could have received no infection during the voyage, as there was not a woman on board. There are instances which render it probable that the virus may lie four, five, or six weeks, and perhaps longer, on the surface of the genitals before it is absorbed; and were it not then to produce a shanker, might probably not be absorbed at all. We see daily examples, where common women communicate the infection to different men in the space of several weeks, while they themselves have not the least symptom of siphilis local or universal, the poison lying all that time in the vagina harmless, and generally without being absorbed. How long the venereal virus may lurk in the body itself, after it has been absorbed into the mass of blood, before it produces any sensible effects, is a matter of equal uncertainty. There is scarce a practitioner who has not observed instances of its remaining harmless for weeks or even months in the body. We had access to observe a case, where after lying dormant for half a year, it broke out with unequivocal symptoms. But the following instance, if to be depended upon, is still more extraordinary.

Some years ago, says Dr. Swediaur, I was consulted by a gentleman about a sore throat,

which I declared to be venereal. My patient was astonished; and assured me that for nine years past he had not had the least venereal complaint, nor had he any reason to believe he had since received any infection: but that he had been in the East Indies, where he was affected with a violent clap. On his return to Europe, being to appearance in good health, he married, and continued perfectly free of any such complaint ever since. By a mercurial course, however, the complaint for which he applied to me was completely removed. With regard to its effects, the venereal poison follows no constant rule: for though, in general it affects first the throat, where it produces ulcerations, while in others it exerts its virulence on the skin or bones. Whilst the greatest part of mankind are thus easily affected by this poison, there are some few who seem to be altogether unsusceptible of the infection with the variolous contagion, though they go into infected places, and expose themselves to inoculation, or every hazard by which the disease is generally communicated.

Some persons are more liable than others to be infected who are seemingly of the same habit; nay, the very same person seems to be more liable to be infected at one time than another, and those who have been once infected seem to be more liable to catch the infection a second time, than those who never were infected before with the disease. The climate, season, age, state of health, idiosyncrasy, are, perhaps, as in other diseases, the necessary predisposing causes. The same difference is observable in the progress made by the disease after the patient is infected. In some the progress is slow, and the disease appears scarce to gain any ground, while in others it advances with the utmost rapidity, and speedily produces the most terrible symptoms. Whether the venereal poison can be absorbed into the system, without a previous excoriation, or ulceration of the genitals, or some other parts of the surface of the body, is still a matter of doubt. Several cases, however, have occurred which render it highly probable, if not certain, that the poison really is now and then absorbed, without any previous excoriation or ulceration whatsoever, and thus produces buboes and other venereal symptoms in the body.

It has been asserted by the earliest and even by some late writers, that it may be caught by lying in the same bed or living in the same room, with or after an infected person. What may have been the case at the commencement of the disease cannot be said, but the most accurate observations and experiments which have been made upon the subject do not confirm this to be the case in our times. Nor are nurses infected in the Lock hospital, where they live night and day with patients in all stages of the distemper. The fact seems to be, that patients in our times are apt to impose upon themselves or upon the physicians and surgeons, with regard to this matter; and the above opinion easily gains ground among the vulgar, especially in countries where people are more influenced by prejudices, superstition, servile situation in life, or other circumstances. Hence, we sometimes hear the most ridiculous accounts given in those countries by friars and common soldiers of the manner by which they came to this disorder: such as piles, gravels, colics, contusions, fevers, little houses, lying in suspected beds, or lying in bed with a suspected person, retention of the semen, coition with a woman in menstruation, the use of cyder, bad wine or beer, &c.

Another question undecided is, whether the venereal poison ever infects any fluid of our body besides the mucous and lymphatic system. Does the venereal poison in an infected woman ever affect the milk; and, consequently, can the infection be conveyed to the infant by the milk alone, without any venereal ulcer on or about the nipples? It is equally a matter of uncertainty whether the venereal disease is ever conveyed from an infected father or mother, by coition, to the fœtus, provided their genitals are sound; or, whether a child is ever affected with venereal symptoms in the uterus of an infected mother. Such infected infants as came under the observation of Dr. Swediaur or of his friends, whose practice afforded them frequent opportunities of seeing new-born infants, seem rather to militate against the opinion. Neither he nor any of them have ever been able to observe ulcerations or other symptoms of a venereal kind upon new-born children; and such as make their appearance four, six, or eight, or more days afterwards, on the genitals, anus, lips, mouth, &c. may rather be supposed to arise by infection during the passage from ulcers in the vagina of the mother, the skin of the infant being then nearly in as tender a state as the glans, penis, or the labia; and this perhaps at the time when an absorption of the venereal poison might easier take place without a previous excoriation, or ulceration of the skin. All the ways, therefore, by which we see, in our days, the venereal poison communicated from an unhealthy to a healthy person may be reduced to the following heads:

1. By the coition of an healthy person with another who is infected with venereal symptoms of the genitals.

2. By the coition of an healthy person with another, apparently healthy, in whose genitals the poison lies concealed, without having yet produced any bad symptom. Thus, a woman who has perhaps received the infection from a man two or three days before, may during that time infect, and often does infect, the man or men who have to do with her afterwards, without having any symptoms of the disease visible upon herself; and, *vice versa*, a man may infect a woman in the same manner. Such instances occur in practice every day.

3. By sucking; in this case the nipples of the wet nurse may be infected by venereal ulcers in the mouth of the child: or *vice versa*, the nipples of the nurse being infected, will

occasion venereal ulcers in the child's nose, mouth, or lips. It is uncertain, as mentioned above, whether the venereal poison was ever propagated by means of the milk from the breast.

4. By exposing to the contact of venereal poison any part of the surface of the body, by kissing, touching, &c. especially if the parts so exposed have been previously excoriated, wounded, or ulcerated by any cause whatever. In this manner we frequently see venereal ulcers arise in the scrotum and thighs; and there are some well attested instances where the infection took place in the fingers of midwives or surgeons. Several instances are recorded of venereal ulcers in the nostrils, eyelids, and lips of persons who had touched their own genitals, or those of others, affected at the time with local venereal complaints, and then rubbed their nostrils, &c. with the fingers, without previously washing the hands. There was, a few years ago, in London, a melancholy example of a young lady, who, after having drawn a decayed tooth, and replaced it with one taken immediately from a young woman apparently in perfect health, was soon after affected with an ulcer in the mouth. The sore manifested symptoms of a venereal nature; but such was its obstinacy, that it resisted the most powerful mercurial remedies, terminating at last in a caries of the maxilla with a most shocking erosion of the mouth and face, by which the unhappy patient was destroyed. During all this, however, we are informed that not the smallest venereal symptom was perceived in the woman from whom the sound tooth was procured.

5. By wounding any part of the body with a lancet or knife infected with the venereal virus. In this instance there is a similarity between the venereal poison and that of the small-pox. There are several examples of the latter being produced by bleeding with a lancet which had been previously employed for the purpose of inoculation, or of opening variolous pustules, without being properly cleaned afterwards. In Moravia, in the year 1577, a number of persons who being assembled in a house for bathing, had themselves, according to the custom of that time, scarified by the barber, were all of them infected with the venereal disease, and treated accordingly. Krato the physician, and Jordan who gave a description of this distemper, are both of opinion that it was communicated by means of the scarifying instrument. And Van Swieten relates several instances where the lues was communicated by a similar carelessness in cleaning the instrument used in bleeding or scarification.

SIPHNOS, one of the Cyclades, situate at the west of Paros, 20 miles in circumference, according to Pliny. The licentiousness of the inhabitants became proverbial. When the inhabitants refused to continue to offer a tenth part of their gold to the god of Delphi, the island was inundated, and the mines disappeared. The air is so wholesome that many of the natives lived to their 120th year.

SIPHON, or SYPHON, in hydraulics, a bended pipe, one end of which being put into a vessel of liquor, and the other hanging out of the said vessel over another, the liquor will run out from the first into the last, after the air has been sucked out of the external or lower end of the siphon, and that as long as the liquor in the upper vessel is above the upper orifice of the siphon.

The motion of water or other liquid through the siphon, depends entirely upon atmospheric pressure. See HYDRAULICS.

SIPHONANTHUS, in botany, a genus of the class tetrandria, order monogynia. Corol one-petalled, funnel-form, very long, inferior; berries four, one-seeded. Two species. One a South American plant with herbaceous stem; the other with flowers in axillary corymbs; native soil unknown.

SIPHONIA. Elastic gum-tree. In botany, a genus of the class monœcia, order monadelphia. Calyx one-leafed; corolless. Male: anthers five, below the top of the column. Female: styleless; stigmas three; capsule three-grained; seeds with a little shell. One species only, siphonia elestica, a tree of Güiana, lofty, naked up to the head; fruit triangular.

The well-known substance, called caoutchouc or gum-elastic, is the inspissated viscid juice procured by making incisions in the bark. For the process by which this is prepared, see the article CAOUTCHOUC.

SI'PPER. *s.* (from *sip.*) One that sips.

SI'PPET. *s.* (from *sip.*) A small sop.

SIPUNCULUS. Tube-worm. In zoology, a genus of the class vermes, order intestina. Body round, elongated; mouth cylindrical at the end, and narrower than the body; aperture at the side of the body and veruciform. Two species.

1. S. nudus. Body covered with a close skin, and globular at the lower end. Inhabits European seas under stones; eight inches long.

2. S. saccatus. Body covered with a loose skin, and rounded at the lower end. Inhabits the American and Indian seas; is shaped like the former, except in being inclosed, as it were, in a loose bag, and in not having the lower end globular.

SIR. *s.* (*sire*, French; *seignior*, Italian; *senor*, Spanish; *senior*, Latin.) 1. The word of respect in compellation (*Shakspeare*). 2. The title of a knight or baronet (*Bacon*). 3. It is sometimes used for *man* (*Shakspeare*). 4. A title given to the loin of beef, which one of our kings knighted in a fit of good humour (*Addison*).

SIRCAR, any officer under the government in Hindustan.

SIRE. *s.* (*sire*, French; *senior*, Latin.) 1. A father: used, in England, in addresses to the king, as the father of his people. 2. It is used of beasts: as, the horse had a good *sire*. 3. It is used in composition; as, grand*sire*.

To SIRE. *v. a.* To beget; to produce (*Shakspeare*).

SIREN. In zoology, a genus of the class amphibia, but of doubtful order, offering a form and configuration approaching equally amphibious reptiles and fishes: whence Linnéus proposed, but did not formally carry into effect, a new order of amphibia, in order to embrace it under the name MEANTES, which see. In general the siren is referred to the order reptilia. It is thus generically described. Body two-footed, tailed, naked; feet furnished in the manner of arms, and furnished with claws. Three species; of which the following is the most decided.

1. S. lacertina. Lizard or eel-shaped siren. Body eel-shaped; brachiæ ramified. Inhabits muddy and swampy places in South Carolina; lives generally under water, but sometimes appears on land; feeds on serpents, which it holds firmly between its jaws; is sometimes a foot and a half long; furnished with external gills like a fish, and with feet like a reptile; has a sort of squeaking or singing voice; when thrown on the ground breaks in pieces like some of the serpents. A very interesting account of the anatomy of this curious animal is given by Mr. J. Hunter, in vol. lvi. of the Philosophical Transactions.

The two other species are still more perplexing as to their classification. They are as follows.

2. S. anguina. Anguine or Austrian siren. Eel-shaped; body cylindric, the tail progressively flattened towards the end, and terminating in a fatty fin; feet four: colour, pale-rose, flesh-colour, or even white; ramified brachial fins bright-red; skin smooth and even; the head somewhat depressed; snout lengthened, obtuse, and widish; no external eyes; mouth moderately wide, and furnished with a row of very minute teeth; legs about three quarters of an inch long; fore-legs under the brachial fins, the feet furnished with three toes without any appearance of claws: hind-legs at a great distance backward, with only two toes, equally destitute of claws. Found only in the lake Zirknitz, the Lugea, Palus of the ancients, in Carniola: active in its native water; but slow of moving in a serpentine direction in any other lake or water. Feeds on the smaller kinds of aquatic animals, and especially on testaceous worms. Shoeiber thinks it doubtful whether this is a mere larve or a perfect animal: yet if a larve, we know not what animal to ascribe it to.

3. S. pisciformis. Fish-formed siren. Mexican tadpole. Fish-gills, opening externally, the external flap continued from the sides of the head across the throat beneath, so as completely to insulate the head from the breast; the gills four, semicircular, and bony or cartilaginous serrated within; on the external flaps three large brachial fins subdivided into a vast number of capillary processes: external opening to the gills small; mouth with a row of extremely minute teeth in front; tongue large, smooth, and rounded at the tip; feet four, without webs, the fore-feet furnished with four, the hind-feet with five toes, the toes possessing weakish claws. Minute white specks scattered over the whole skin, resembling those on the siren lacertina: body deeply and thickly spotted. Supposed to be a native of Mexico, and perhaps no other than the larve or tadpole of some large American lizard. In its general appearance it resembles the larve of the rana paradoxica.

SIRENS, in fabulous history, sea nymphs who charmed so much with their melodious voice, that all forgot their employments to listen with more attention, and at last died for want of food. They were daughters of the Achelous, by the muse Calliope, or, according to others, by Melpomene or Terpsichore. They were three in number, Parthenope, Ligeia, and Leucosia, and they usually lived in a small island near the cape Pelorus in Sicily. Some authors suppose that they were monsters, and had the body of a woman above the waist, and the rest of the body like that of a bird. The sirens were informed by the oracle, that as soon as any person passed by them without suffering themselves to be charmed by their songs they should perish; and their melody had prevailed in calling the attention of all passengers, till Ulysses, informed of the power of their voice by Circe, stopped the ears of his companions with wax, and ordered himself to be tied to the mast of his ship, and no attention to be paid to his commands, should he wish to listen to the song. This was a salutary precaution, and Ulysses passed the fatal coast with safety. Upon this artifice of Ulysses, the sirens were so disappointed that they threw themselves into the sea and perished. The place where the sirens destroyed themselves was afterwards called Sirenis, on the coast of Sicily. Virgil, however, places the Sirenum Scopuli on the coast of Italy, near the island of Caprea. The sirens are often represented holding, one a lyre, a second a flute, and the third singing.

Pope, in his notes to the twelfth book of the Odyssey, observes, the critics have greatly laboured to explain what was the foundation of this fiction of the sirens. We are told by some that the sirens were queens of certain small islands named Sirenusæ, that lie near Capræa in Italy, and chiefly inhabited the promontory of Minerva, upon the top of which that goddess had a temple, as some affirm, built by Ulysses. Here there was a renowned academy, in the reign of the sirens, famous for eloquence and the liberal sciences, which gave occasion to the invention of this fable of the sweetness of the voice and attracting songs of the sirens But why then are they fabled to be destroyers, and painted in such dreadful colours? We are told, that at last the students abused their knowledge, to the colouring of wrong, the corruption of manners, and the subversion of government: that is, in the language of poetry, they were feigned to be transformed into monsters, and with their music to have enticed passengers to their ruin, who there consumed their patrimonies, and poisoned their virtues with riot and effe-

Sirex or Tailed Wasp.

S. Gigas.

fem.

mas.

Silpha or Carrion Beetle.

S. Germanica.

S. Atrata.

S. Rugosa.

Aphis?

S. Spirifex

S. Vastica?

Staphylinus.

Murinus.

Maxillosus.

Vespa or Wasp.

V. Vulgaris.

V. Parietum.

V. Crabro.

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minacy. The place is now called Massa. Some writers tell us of a certain bay, contracted within winding straits and broken cliffs, which, by the singing of the winds and beating of the waters, returns a delightful harmony, that allures the passengers to approach, who is immediately thrown against the rocks, and swallowed up by the violent eddies. Thus Horace, moralizing, calls idleness a siren.

——Vitanda est improba siren
Desidia.——

But the fable may be applied to all pleasures in general, which, if too eagerly pursued, betray the incautious into ruin: while wise men, like Ulysses, making use of their reason, stop their ears against their insinuations.

The learned Mr. Bryant says, that the sirens were Cuthite and Canaanitish priests, who had founded temples in Sicily which were rendered infamous on account of the women who officiated. They were much addicted to cruel rites, so that the shores upon which they resided are described as covered with the bones of men destroyed by their artifice. Virgil. Æneid. lib. v, v. 864.

SIREX. Tailed-wasp. In zoology, a genus of the class insecta, order hymenoptera. Mouth with a thick, horny, truncate, short, denticulate mandible; feelers four, the hind-ones longer and thicker upwards; antennas filiform, of more than twenty-four equal articulations; sting exserted, serrate, stiff; abdomen sessile, terminating in a point; wings lanceolate, incumbent, the lower ones shorter. Twenty-six species; the larves of which are six-footed, soft, cylindrical, the head-rounded; they perforate wood, and frequently eat their way into the bowels of other insects and their larves, living upon and consuming their vitals. Pupe, folliculate. The perfect insect lives on the nectar of flowers.

Of these, about six are common to our own country, of which sirex gigas is the largest. The male, however, as is frequently the case in the economy of insects, is a third less in size than the female, and has neither spine nor sting at his extremity: that instrument, however, is formidable in the other sex; it consists of three laminæ; two at the sides, which serve for sheaths, and one in the middle, somewhat serrated, which is the real sting. The wings of this species are large, yellow, and veined; the thighs short, and black; and the legs, as well as the tarsi, are yellow; the antennas are of the same colour, and are inserted into a black head, which has apparently four eyes. What appears, however, to be the second pair of eyes is only two large yellow spots behind the other eyes. The belly is cylindrical, and consists of nine different segments, some of a black, and others of a yellow colour. See Nat. Hist. pl. CLXXVIII.

SIRIUS, the dog-star; a very bright star of the first magnitude, in the mouth of the constellation Canis Major, or the Great Dog. This is the brightest of all the stars in our firmament, and therefore probably, says Dr. Maskelyne, the late astronomer royal, the nearest to us of them all. Some, however, suppose Arcturus to be the nearest. This is one of the earliest named stars in the whole heavens. Hesiod and Homer mention only four or five constellations, or stars, and this is one of them. Sirius and Orion, the Hyades, Pleiades, and Arcturus, are almost the whole of the old poetical astronomy. The three last the Greeks formed of their own observation, as appears by the names; the two others were Egyptian. Sirius was so called from the Nile, one of the names of that river being Siris; and the Egyptians, seeing that river begin to swell at the time of a particular rising of this star, paid divine honours to the star, and called it by a name derived from that of the river, expressing the star of the Nile. Such, at least, is one opinion; but there are other speculations on this subject. Besides the name Sirius, the star was also called Thot or Tahout, that is to say, the dog; as we learn from several ancient authors. This name they say was given by the Egyptians, because, as a faithful dog gives notice of the approach of a stranger, so this star apprized them of the periodical overflow of the Nile: it was also in part in memory of Thot or Mercury, of whom the Egyptian historians recount so many wonders, and who was depicted hieroglyphically with the head of a dog. See Montucla's Hist. Mathem. tom. i, pp. 72, 83.

SIROCCO, a periodical wind which generally blows in Italy and Dalmatia every year about Easter. It blows from the south-east by south: it is attended with heat, but not rain; its ordinary period is twenty days, and it usually ceases at sun-set. When the sirocco does not blow in this manner, the summer is almost free from westerly winds, whirlwinds, and storms. This wind is prejudicial to plants, drying and burning up the buds; though it hurts not men any otherwise than by causing an extraordinary weakness and lassitude; inconveniences that are fully compensated by a plentiful fishing, and a good crop of corn on the mountains. In the summer time, when the westerly wind ceases for a day, it is a sign that the sirocco will blow the day following, which usually begins with a sort of whirlwind.

SI'RRAH. *s.* (*sir, ha! Minshew.*) A compellation of reproach and insult (*L'Estrange*).

SI'ROP. Sirup. *s.* (Arabic.) The juice of vegetables boiled with sugar (*Sidney*).

SI'RUPED. *a.* (from *sirup.*) Sweet, like sirup; bedewed with sweets (*Drayton*).

SI'RUPY. *a.* (from *sirup.*) Resembling sirup (*Mortimer*).

SISKIN, or Greenfinch. See Fringilla.

SISON. Bastard stone-parsley. Honeywort In botany, a genus of the class pentandria, order digynia. Fruit ovate, striate; involucres about four-leaved; petals lanceolate, inflected. Six species; four natives of North America, Egypt, Siberia, or Portugal; the two following common to our own country:

1. S. amomum. Common honey-wort. Leaves pinnate; umbels erect, about four rayed. The seeds were formerly employed as a diuretic and carminative, both by themselves, and in tincture with spirit of wine, to which they give their flavour very freely.

2. S. segetum. Corn-parsley. Leaves pinnate; leaflets roundish; umbels drooping irregular; found wild in our hedges.

SI'STER. *s.* (ꝛpeoꝛꝛen, Saxon; *zuster*, Dutch.) 1. A woman born of the same parents; correlative to brother (*Job*). 2. Woman of the same faith; a christian; one of the same nature; human being (*James*). 3. A female of the same kind (*Shakspeare*). 4. One of the same kind; one of the same condition (*Pope*).

SI'STER-IN-LAW. *s.* A husband or wife's sister (*Ruth*).

SI'STERHOOD. *s.* (from *sister*.) 1. The office or duty of a sister (*Daniel*). 2. A set of sisters. 3. A number of women of the same order (*Addison*).

SI'STERLY. *a.* (from *sister*.) Like a sister; becoming a sister (*Shakspeare*).

SISTRUM, CISTRUM, or CITRON. An ancient stringed musical instrument of percussion, of Egyptian invention, and used by the priests of Isis and Osiris in sacrifice. The sistrum is described by musical writers as of an oval form. Three sticks, transversely traversing the instrument, were agitated by a motion given to the whole, and the strings struck by these produced a melodious sound. Oiselius and other authors observe, that the representation of the sistrum is found on ancient medals, and on talismans. Osiris is sometimes pictured on them with a dog's head and a sistrum in his hand.

SISYMBRIUM. Wild rocket. In botany, a genus of the class tetradynamia, order siliquosa. Silique cylindrical, bursting with nearly straight valves; calyx and corol spreading. Fifty-three species, thus subdivided.

A. Siliques declining short.
B. Siliques sessile, axillary.
C. Stem naked.
D. Leaves pinnate.
E. Leaves lanceolate, undivided.

Scattered over the warm climates of the globe for the most part; four common to our own wastes, three to our marshes or rivulets. The following are chiefly entitled to notice.

1. S. nasturtium. Water-cress. Siliques declining, leaves pinnate, with roundish, heart-shaped leaflets. Found in our rivulets.

2. S. sylvestre. Water-rocket. Grows wild in our marshes.

3. S. amphibium. Water-radish. Wild in our rivulets.

4. S. sophia. Flix-weed. Wild in our wastes; formerly employed in hysterical affections and uterine hæmorrhages, under the name of sophia chirurgorum.

5. S. iris. Broad-leaved hedge mustard. Found wild in our wastes.

SISYPHUS, in fabulous history, a son of Æolus and Enaretta, the most crafty prince of the heroic ages. He married Merope, the daughter of Atlas, or, according to others, of Pandareus, by whom he had several children. It is reported that Sisyphus, mistrusting Autolycus, who stole the neighbouring flocks, marked his bulls under the feet, and when they had been carried away by Autolycus, he confounded him, by selecting those bulls which he knew to be his own. The artifice of Sisyphus so pleased Autolycus, that he permitted him to enjoy the company of his daughter Anticlea, afterwards the wife of Laertes of Ithaca. After his death, Sisyphus was condemned in hell, to roll to the top of a hill a large stone, which had no sooner reached the summit, than it fell back into the plain with impetuosity, and rendered his punishment eternal. This rigorous sentence is generally attributed to his continual depredations in the neighbouring country, and his cruelty in laying heaps of stones on those whom he had plundered, and suffering them to expire in the most agonizing torments. The institution of the Pythian games is attributed by some to Sisyphus. To be of the blood of Sisyphus was deemed disgraceful among the ancients.

SISYRINCHIUM. In botany, a genus of the class monadelphia, order triandria. Spathe two-leaved; calyxless; petals six, nearly equal; style one; capsule three-celled, inferior. Eight species; two natives of the Cape; four of North and South America, or the Bermudas. The two following are cultivated.

1. S. Bermudiana. Iris-leaved sisyrinchium, a native of the Bermudas.

2. S. anceps. Narrow-leaved sisyrinchium. A native of Virginia; the former flowering with a deep-blue, the latter with a pale-blue corol.

To SIT. *v. n.* preterit *I sat*, (*sitan*, Gothic; ꝛittan, Saxon; *setten*, Dutch.) 1. To rest upon the buttocks (*May*). 2. To perch (*Bourd*). 3. To be in a state of rest, or idleness (*Milton*). 4. To be in a local position (*Milton*). 5. To rest as a weight or burden (*Taylor*). 6. To settle; to abide (*Milton*). 7. To brood; to incubate (*Bacon*). 8. To be adjusted; to be with respect to fitness or unfitness (*Shakspeare*). 9. To be placed in order to be painted (*Garth*). 10. To be in any situation or condition (*Swift*). 11. To be convened, as an assembly. 12. To be placed at the table (*Luke*). 13. To exercise authority (*Milton*). 14. To be in any solemn assembly as a member (1 *Mac.*). 15. *To* SIT *down*. To begin a siege (*Clarendon*). 16. *To* SIT *down*. To rest; to cease as satisfied (*Rogers*). 17. *To* SIT *down*. To settle; to fix abode (*Spenser*). 18. *To* SIT *out*. To be without engagement or employment (*Sand.*). 19. *To* SIT *up*. To rise from lying to sitting (*Luke*). 20. *To* SIT *up*. To watch; not to go to bed (*Ben Jonson*).

To SIT. *v. n.* 1. To keep the seat upon (*Prior*). 2. To place on a seat (*Bacon*).

SITE. *s.* (*situs*, Latin.) Situation; local position (*Bentley*).

SIT-FAST. This proceeds generally from

a warble (see WARBLES), and is a horny tumour on a horse's hide. If it cannot be dissolved and softened by rubbing with mercurial ointment, it must be cut out, and then treated as a fresh wound.

SITH. *ad.* (ꝛiðe, Saxon.) Since; seeing that: obsolete (*Hooker*).

SITHE. *s.* (ꝛiðe, Saxon.) The instrument of mowing; a crooked blade joined at right angles to a long pole. See SCYTHE.

SITHE. *s.* Time: obsolete (*Spenser*).

SI'THENCE. *ad.* (now contracted to *since*.) Since; in latter times (*Spenser*).

SI'THNESS. *ad.* Since (*Spenser*).

SITHA. Nuthatch. In zoology, a genus of the class aves, order picæ. Bill subulate, roundish, straight, entire; upper mandible a little longer, compressed, and angular at the tip; tongue jagged, short, horny at the tip; nostrils small, covered with bristles; feet formed for walking; hind-toe long. Twelve species; chiefly natives of America and the West Indies, a few of the Cape, and one of Europe.

This last species is denominated sitha Europæa, and is thus characterised: cinereous, beneath reddish; tail-feathers black; the four lateral ones beneath tipt with white. There is another variety, less in size. This species is not uncommon to our own country. They creep up and down upon the trunks of trees, like the woodpecker tribes, and build in their hollows. If the entrance of the hole be too large, they artfully fill it up with clay, till it admit only their own body; a circumstance from which the French have called them *torche-pots*, or potters. When the nest is constructed, it is used for a magazine for winter provision, and a retreat during the night.

The edifice of the nuthatch, thus finished, has hardly any appearance of being the receptacle of birds, to those who view it from without. There, however, upon the dust of the tree, overlaid with moss, the female deposits seven eggs, of a dirty white colour, with small red spots. These she hatches with so much assiduity and attachment, that, rather than abandon them, she will allow the feathers to be torn from her body. If a stick be introduced into her apartment, she expresses her rage by hissing and blowing, like a serpent, without stirring from her eggs. So intent is she in discharging her maternal duties, that even the calls of hunger do not compel her to leave the nest: she waits till food is brought her by the male, who performs this office of tenderness with the greatest regularity.

They feed not only upon ants, like the woodpeckers, but also upon the kernels of nuts, and upon almost every kind of insect and their larves. It is pleasing to see them bring a nut from their hoard, and place it fast in a chink, and then standing above it, with their heads downwards, and striking it with all their force till they break it, when they scoop out the kernel. The young of this genus commonly make their appearance in the month of May. As soon as they are trained, and become independent of parental care, it is seldom that the father and mother attempt to rear a new family; they separate from each other, and spend the winter in solitude. Some naturalists impute this separation to the female, and have asserted that her husband chastises her for her desertion whenever he finds out the place of her retreat: hence the proverb, that compares to a nuthatch the master of a family who maintains his authority over his wife by similar methods. But whatever may be the case with jealous husbands in such circumstances, it does not appear that this bird has any intention of beating his wife; on the contrary, it would seem, that, after their accidental meeting, what appears rough treatment, is only the caresses of the male, and the lively expression of that tenderness which absence has increased.

In the pairing season, when it is actuated by love, this bird sings during the day; but, at other times, it is said to sing in the night.

SI'TTER. *s.* (from *sit*.) 1. One that sits (*Bacon*). 2. A bird that broods (*Mortimer*).

SI'TTING. *s.* (from *sit*.) 1. The posture of sitting on a seat. 2. The act of resting on a seat (*Psalms*). 3. A time at which one exhibits himself to a painter (*Dryden*). 4. A meeting of an assembly (*Bacon*). 5. A course of study unintermitted (*Locke*). 6. A time for which one sits, as at play, or work, or a visit (*Dryden*). 7. Incubation (*Addison*).

SITTING, in botany. See SESSILE.

SITTINGBURN, a small corporate town in Kent, 15 miles W.N.W. of Canterbury, and 40 E.S.E. of London. Lon. 0. 48 E. Lat. 51. 19 N.

SI'TUATE. *part. a.* (from *situs*, Latin.) 1. Placed with respect to any thing else (*Bac.*). 2. Placed; consisting (*Milton*).

SITUATION. *s.* (from *situate*.) 1. Local respect; position (*Addison*). 2. Condition; state (*Rogers*).

SIUM. Water parsnep. In botany, a genus of the class pentandria, order digynia. Fruit nearly oval, compressed, striate: involucres many-leaved; petals heart-shaped, uniform. Nineteen species; mostly natives of warm climates, the greater number of the Cape; five indigenous to our own ditches, moist grounds, or meadows. Of these one only, sium sisarum, skirret, is cultivated. Its leaves are pinnate, the floral leaves ternate; the root a bunch of fleshy fibres, each about as thick as the finger, but very uneven, covered with a whitish rough bark, and has a hard core or pith running through the centre. In its flavour and nutritive qualities it approaches nearer to the parsnep than any of the esculent plants, and is on this account cultivated largely in Germany: half a pound of this root has yielded an ounce and a half of sugar.

The skirret is a native of China, and may be propagated either by sowing the seeds, or by planting the slips and off-sets, but the first is much the best method. It should be sown on a moist, rich soil, in the beginning of February; in April the young plants will come up, when they must be cleared of weeds, and

houghed up to three inches asunder; and about a month afterwards they must be thinned a second time, leaving them only six inches distant. After this they must be carefully kept clear from weeds, and when their leaves are decayed, they should be taken up for use; but this should only be done as they are wanted, for they spoil with lying out of the ground. The leaves decay in October, and from that time till the middle of March the roots are in season; after this the roots become good for little.

SIWAH, a territory of Africa, on the confines of Egypt and Barca. It is mentioned by the ancients under the name of the Oasis of Ammon. The fertile part is about 20 miles in circumference, containing several villages, beside the capital. It affords abundance of vegetable productions, with corn and oil; and is well supplied with water from small streams, but none of them flow beyond its territory; they being either evaporated before they reach the surrounding desert, or lost in the sterile sand. The capital, of the same name, contains the ruins of the celebrated temple of Jupiter Ammon; and in the neighbourhood are many catacombs, which were the burying places of the ancient inhabitants. It is 220 miles E. of Augila, and 280 W. by S. of Cairo. Lon. 27. 10 E. Lat. 29. 12 N.

SIX. *a.* (*six*, Fr.) Twice three; one more than five.

SIX AND SEVEN. *s.* To be at *six and seven*, is to be in a state of disorder and confusion (*Shakspeare*).

SI'XPENCE. *s.* (*six* and *pence*.) A coin; half a shilling (*Pope*).

SIXSCO'RE. *a.* (*six* and *score*.) Six times twenty (*Sandys*).

SIXTEE'N. *a.* (ꝛixtýne, Saxon.) Six and ten.

SI'XTEENTH. *a.* (ꝛixteoða, Sax.) The sixth after the tenth.

SIXTH. *a.* (ꝛixta, Sax.) The first after the fifth; the ordinal of six.

SIXTH. *s.* (from the adjective.) A sixth part (*Cheyne*).

SIXTH, in music, is not properly, as some have supposed, an original concord, since it arises from the subtraction of the third from the octave. There are properly but three original concords, the octave, fifth, and third major. See FUNDAMENTAL and INTERVAL.

The sixth is of two kinds, greater and less; and hence it is esteemed one of the imperfect concords; though each of the two species arises from a division of the octave.

The greater sixth, called by the Greeks *hexachordon majus*, is the concord resulting from a mixture of the sounds of two strings, that are to each other as 5 to 3.

The lesser sixth, *hexachordon minus*, results from two strings, which are to each other as 8 to 5.

The less sixth is composed diatonically of six degrees, whence its name; and of five intervals, three whereof are tones; and two semitones; chromatically of eight semitones; five whereof are greater, and three less. It has its form or origin from the *ratio super-tri-partiens quintas*: as of 8 to 5.

The greater sixth is composed diatonically, like the less, of six degrees and five intervals; among which are four tones, and a semitone: and chromatically of nine semitones; five whereof are greater, and four less; of consequence it has a less semitone more than the former. It has its origin from the *ratio super-bi-quartiens tertias*; as 5 to 3.

Anciently, the sixth had only one repetition, which was the 13th; but, in the modern system, it has several, as the 20th, 27th, &c. all marked indifferently in the thorough bass, by the figure 6. And even the sixth itself, both greater and less, when natural, is not expressed any otherwise than by a simple 6. But when it is greater or less, by accident, to the 6 is added the mark of a sharp or a flat: as may be seen in M. Brossard.

Besides the two kinds of sixths here described, which are both good concords, there are two others that are vicious and dissonant.

The first sixth is the defective, composed of two tones and three semitones, or of seven semitones, five whereof are greater, and two less.

The second sixth is the redundant, composed of four tones, a greater semitone, and a less. Whence some call it pentatonon, as comprehending five tones.

These two, being both discords, should never be used in melody, and very rarely in harmony.

SIX-CLERKS, officers in chancery of great account, next in degree below the twelve masters; whose business is to inrol commissions, pardons, patents, warrants, &c. which pass the great-seal, and to transact and file all proceedings by bill, answer, &c.

They were anciently *clerici*, and forfeited their places, if they married; but when the constitution of the court began to alter, a law was made to permit them to marry. Stat. 14 and 15 Hen. VIII. cap. 8. They are also solicitors for parties in suits depending in the court of chancery.

Under them are six deputies and sixty clerks, who, with the under clerks, do the business of the office.

SI'XTHLY. *ad.* (from *six*.) In the sixth place (*Bacon*).

SI'XTIETH. *a.* (ꝛixteoꝛoða, Sax.) The tenth six times repeated.

SI'XTY. *a.* (ꝛixtiꝛ, Sax.) Six times ten.

SIYA GHUSH, the caracal of Buffon. See FELIS.

SIZAR, or SIZER, in Latin *Sizator*, an appellation by which the lowest order of students in the universities of Cambridge and Dublin are distinguished, is derived from the word *size*, which in Cambridge, and probably in Dublin likewise, has a peculiar meaning. To size, in the language of the university, is to get any sort of victuals from the kitchens, which the students may want in their own rooms, or in addition to their commons in the hall, and

for which they pay the cooks or butchers at the end of each quarter. A size of any thing is the smallest quantity of that thing which can be thus bought: two sizes, or a part of beef, being nearly equal to what a young person will eat of that dish to his dinner; and a size of ale or beer being equal to half an English pint.

The sizars are divided into two classes, viz. subsizators or sizars, and sizatores or proper sizars. The former of these are supplied with commons from the table of the fellows and fellow-commoners: and in former times, when these were more scanty than they are now, they were obliged to supply the deficiency by sizing, as is sometimes the case still. The proper sizars had formerly no commons at all, and were therefore obliged to size the whole. In St. John's college they have now some commons allowed them for dinner, from a benefaction, but they are still obliged to size their suppers: in the other colleges they are allowed a part of the fellow-commons, but must size the rest; and from being thus obliged to size the whole or part of their victuals, the whole order derived the name of sizars.

In Oxford, the order similar to that of sizar is denominated servitor, a name evidently derived from the menial duties which they perform. In both universities these orders were formerly distinguished by round caps and gowns of different materials from those of the pensioners or commoners, the order immediately above them. But about 30 years ago the round cap was entirely abolished in both seminaries. There is still, however, in Oxford, we believe, a distinction in the gowns, and there is also a trifling difference in some of the small colleges in Cambridge; but in the large colleges the dress of the pensioners and sizars is entirely the same.

In Oxford, the servitors are still obliged to wait at table on the fellows and gentlemen-commoners; but, much to the credit of the university of Cambridge, this most degrading and disgraceful custom was entirely abolished about 18 or 20 years ago, principally, we believe, through the exertions of Dr. Milner, the present excellent dean of Carlisle, and master of Queen's college.

SIZE. *s.* (from *assise*, French.) 1. Bulk; quantity of superficies; comparative magnitude (*Raleigh*). 2. A settled quantity (*Shakspeare*). 3. Figurative bulk; condition (*Swift*).

SIZE, a kind of glue used by painters, &c. See GELATIN.

To SIZE. *v. a.* (from the noun.) 1. To adjust, or arrange according to size (*Dryden*). 2. To settle; to fix (*Bacon*). 3. To cover with glutinous matter; to besmear with size.

SI'ZED. *a.* (from *size.*) Having a particular magnitude (*Shakspeare*).

SI'ZEABLE. *a.* (from *size.*) Reasonably bulky; of just proportion to others (*Arbuthnot*).

SI'ZINESS. *s.* (from *sizy.*) Glutinousness; viscosity (*Floyer*).

SI'ZY. *a.* (from *size.*) Viscous; glutinous (*Arbuthnot*).

SKA'DDLE. *s.* (rcaðniyre, Sax.) Hurt; damage.

SKA'DDONS. *s.* The embryos of bees.

SKAI'NSMATE. *s.* A messmate (*Shakspeare*).

SKATE, in ichthyology. See RAIA.

SKATE, the patten with an iron axis or sole, which is fastened to each foot of those who practise skating.

SKATING, an exercise on ice, both graceful and healthy. Although the ancients were remarkable for their dexterity in most of the athletic sports, yet skating seems to have been unknown to them. It may therefore be considered as a modern invention; and probably it derived its origin in Holland, where it was practised, not only as a graceful and elegant amusement, but as an expeditious mode of travelling when the lakes and canals were frozen up during winter. In Holland long journeys are made upon skates with ease and expedition; but in general less attention is there paid to graceful and elegant movements, than to the expedition and celerity of what is called journey skating. It is only in those countries where it is considered as an amusement that its graceful attitudes and movements can be studied; and there is no exercise whatever better calculated to set off the human figure to advantage. The acquirement of most exercises may be attained at an advanced period of life; but to become an expert skater, it is necessary to begin the practice of the art at a very early age. It is difficult to reduce the art of skating to a system. It is principally by the imitation of a good skater that a young practitioner can form his own practice. Those who wish to be proficients should begin at an early period of life, and should first endeavour to throw off the fear which always attends the commencement of an apparently hazardous amusement. They will soon acquire a facility of moving on the inside; when they have done this, they must endeavour to acquire the movement on the outside of the skates, which is nothing more than throwing themselves upon the outer edge of the skate, and making the balance of their body tend towards that side, which will necessarily enable them to form a semicircle. In this much assistance may be derived from placing a bag of lead shot in the pocket next to the foot employed in making the outside stroke, which will produce an artificial poise of the body, which afterwards will become natural by practice. At the commencement of the outside stroke, the knee of the employed limb should be a little bended, and gradually brought to a rectilinear position when the stroke is completed. When the practitioner becomes expert in forming the semicircle with both feet, he is then to join them together, and proceed progressively and alternately with both feet, which will carry him forward with a graceful movement. Care should be taken to use very little muscular exertion, for the im-

pelling motion should proceed from the mechanical impulse of the body thrown into such a position as to regulate the stroke. At taking the outside stroke, the body ought to be thrown forward easily, the unemployed limb kept in a direct line with the body, and the face and eyes directly looking forward: the unemployed foot ought to be stretched towards the ice, with the toes in a direct line with the leg. In the time of making the curve, the body must be gradually and almost imperceptibly raised, and the unemployed limb brought in the same manner forward; so that, at finishing the curve, the body will bend a small degree backward, and the unemployed foot will be about two inches before the other, ready to embrace the ice, and form a correspondent curve. The muscular movement of the whole body must correspond with the movement of the skate, and should be regulated so as to be almost imperceptible to the spectators. Particular attention should be paid in carrying round the head and eyes with a regular and imperceptible motion; for nothing so much diminishes the grace and elegance of skating as sudden jerks and exertions, which are too frequently used by the generality of skaters. The management of the arms likewise deserves attention. There is no mode of disposing of them more gracefully in skating outside, than folding the hands into each other, or using a muff.

There are various feats of activity and manœuvres used upon skates; but they are so various that we cannot pretend to detail them. Moving on the outside is the primary object for a skater to attain; and when he becomes an adept in that, he will easily acquire a facility in executing other branches of the art. There are few exercises but will afford him hints of elegant and graceful attitudes. For example, nothing can be more beautiful than the attitude of drawing the bow and arrow whilst the skater is making a large circle on the outside: the manual exercise and military salutes have likewise a pretty effect when used by an expert skater.

Those who wish to attain the art of rapid skating should also begin early, and imitate the easy graceful motion of other rapid skaters. They must avoid a "short stroke," as it is termed, as well as throwing up the heels so as to show the bottom of the skate behind. The writer of this article has known skaters in the fens of Cambridgeshire and Huntingdonshire skate two miles in two minutes, the strokes on an average being each ten yards. This velocity exceeds that of most race-horses; and the fatigue occasioned by it is much less.

SKE'AN. *s.* (Irish and Erse.) A short sword; a knife (*Bacon*).

SKEG. *s.* A wild plum.

SKE'GGER. *s.* *Skeggers* are bred of such sick salmon that might not go to the sea, and never thrive to any bigness (*Wotton*).

SKEIN. *s.* (*escaigne*, Fr.) A knot of thread or silk wound and doubled (*Ben Jonson*).

SKELETON. (*sceletus*, from σκιλλω, to dry.) When the bones of the body are preserved in their natural situation, and deprived of the flesh, the assemblage is called a skeleton. See BONES.

SKELETON (Artificial). The assemblage of all the bones of the animal, when hung in their respective situations by means of wire. See BONES.

SKELETON (Natural). A skeleton is so termed in opposition to an artificial one, when the bones are retained in their proper places by means of their natural ligaments.

SKE'LLUM. *s.* (*skelm*, Germ.) A villain; a scoundrel (*Skinner*).

SKEP. *s.* (rcephen, lower Saxon; to draw.) A sort of basket, narrow at the bottom, and wide at the top, to fetch corn in (*Tusser*).

SKE'PTIC. *s.* (σκηπτομαι; *sceptique*, Fr.) One who doubts, or pretends to doubt, of every thing (*Pope*).

SKE'PTICAL. *a.* (from *skeptic.*) Doubtful; pretending to universal doubt (*Bentley*).

SKE'PTICISM. *s.* (*scepticisme*, Fr. from *skeptic.*) Universal doubt; pretence or profession of universal doubt (*Dryden*).

SKETCH. *s.* (*schedula*, Lat.) An outline; a rough draught; a first plan (*Addison*).

To SKETCH. *v. n.* (from the noun.) 1. To draw, by tracing the outline (*Watts*). 2. To plan, by giving the first or principal notion.

SKE'WER. *s.* (*skere*, Danish.) A wooden or iron pin, used to keep meat in form (*King*).

To SKE'WER. *v. a.* (from the noun.) To fasten with skewers.

SKIFF. *s.* (*esquief*, Fr. *scapha*, Latin.) A small light boat (*Swift*).

SKI'LFUL. *a.* (*skill* and *full.*) Knowing; qualified with skill; possessing any art; dexterous; able (*Tatler*).

SKI'LFULLY. *ad.* (from *skilful.*) With skill; with art; with uncommon ability; dexterously (*Broome*).

SKI'LFULNESS. *s.* (from *skilful.*) Art; ability; dexterousness (*Psalms*).

SKILL. *s.* (*skill*, Islandic.) 1. Knowledge of any practice or art; readiness in any practice; knowledge; dexterity; artfulness (*Milton*). 2. Any particular art (*Hooker*).

To SKILL. *v. n.* (*skilia*, Islandic.) 1. To be knowing in; to be dexterous at (*Whitgift*). 2. To differ; to make difference; to interest; to matter: not in use (*Hooker*).

SKI'LLED. *a.* (from *skill.*) Knowing; dexterous; acquainted with (*Milton*).

SKILLESS. *a.* (from *skill.*) Wanting skill; artless: not in use (*Shakspeare*).

SKI'LLET. *s.* (*escuellette*, French.) A small kettle or boiler (*Shakspeare*).

To SKIM. *v. a.* (properly to *scum.*) 1. To clear off from the upper part, by passing a vessel a little below the surface (*Prior*). 2. To take by skimming (*Addison*). 3. To brush the surface slightly; to pass very near the surface (*Dryden*). 4. To cover superficially. Improper: perhaps originally *skin* (*Dryden*).

To SKIM. *v. n.* To pass lightly; to glide along (*Pope*).

SKI'MBLESKAMBLE. *a.* Wandering; wild (*Shakspeare*).

SKI'MMER. *s.* (from *skim.*) A shallow vessel with which the scum is taken off (*Mortimer*).

SKIMMIA, in botany, a genus of the class tetrandria, order monogynia. Petals four, concave; calyx four-parted; berry four-seeded. One species only, a native of Japan, with alternate branches, ever-green leaves and terminal panicle.

SKIM-MILK. *s.* Milk from which the cream has been taken.

SKIN. The skin itself was called, by the Greeks, δερμις, and the scarf skin, in their usual way, επιδερμις. It is said to have been called δερμις παρα το δερειν, *quia exuitur quibusdam animalibus*, because it is cast by many animals once a year; the epidermis certainly is so. Hippocrates uses the words δερμις and επιδερμις sometimes in the same sense, as if both meaned equally the skin. The cuticle is supposed indeed by some to be cast by all animals, either sensibly at one period of the year, or insensibly in scales, at all times of the year, as in man. Lewenhoek imagined he saw these scales by means of the microscope; and Boerhaave thought he proved their existence, by wearing continually black silk gloves, which after some time he inverted, and imagined he clearly saw these scales. Others say that δερμις is used for δεσμα, *quasi vinculum totius corporis*, as the membrane binding together all the parts of the body into one. The Romans called it *pellis*; evidently from *pellens*, repelling; as it forms vesications, and endeavours to push off matter suddenly offending the body, as on application of scalding water, liquid caustic, alkali, or red hot iron. It is said likewise to have been called *cutis*, *ex κυτειν investire*, as the investing membrane of the whole body.

When carefully dissected off, and separated from all adventitious matter, in a middle sized man, it weighs about four pounds and a half.

The skin, though apparently a simple membrane, is in reality laminated, consisting of several subdivisions; the outermost lamen is termed with us scarf skin, or cuticle; the second has no English name, is known only to anatomists, and is called rete mucosum; after these two are removed we come to, as is commonly thought, the surface of the skin itself.

When a blister has been applied to the skin of a Negro, if it has not been very stimulating, in twelve hours after a thin transparent grayish membrane is raised, under which we find a fluid. This membrane is the cuticle or scarf skin. When this, with the fluid, is removed, the surface under them appears black; but if the blister had been very stimulating, another membrane, in which this black colour resides, would also have been raised with the cuticle; this is rete mucosum, which is itself double, consisting of another gray transparent membrane, and of a black web, very much resembling the nigrum pigmentum of the eye. When this membrane is removed, the surface of the true skin (as has hitherto been believed), comes in view, and is white, like that of a European. The rete mucosum gives the colour to the skin; is black in the Negro; white, brown, or yellowish, in the European. The reason why this membrane is black in the Negro, is, perhaps, that his body may be better able to defend itself against the sun's rays, and that the heat may be prevented from penetrating. The intention of a similar membrane behind the retina in the eye, appears to be not only that of absorbing the superfluous rays of light; but, like the amalgam behind the looking-glass, it may enable the retina to reflect the rays, in order to perfect vision. It is not very improbable that some such purpose, as enabling the cuticle to reflect the sun's rays in those warm climates, where the inhabitants originally go naked, may be the intention of nature, in giving them the black membrane. Perhaps too, the circumstance of the countenance's becoming brown, when exposed to the sun's rays in summer, in our own climate, may be a process of nature to defend herself against the access of external heat into the body.

Both cuticle and rete mucosum send innumerable processes into the pores of the true skin; the process of the rete mucosum is always within that of the cuticle, and in contact with the sides of the pore, as formed by the true skin. These processes are remarkable in the cuticle and rete mucosum of the elephant, some of them are almost an inch long; the cuticle, or rete mucosum, or a membrane very similar, having the same properties with these, appears to be also continued into the inside of the mouth, over the tongue, internal surface of the lungs, œsophagus, stomach, and intestinal tube. In most of the last named parts, the cuticle, however, forms sheaths for villi, and not processes which line pores. On viewing the surface of the skin, even with the naked eye, we find it porous; more so in some places than in others; and the pores are also larger in some parts than others. These pores are ducts of sebaceous glands, and serve not only to transmit hairs, but, it is supposed, the greatest part of the perspirable matter itself. Absorption on the skin also, in all probability, begins on the sides of these pores. They are particularly remarkable about the mouth, nose, palms of the hands, soles of the feet, on the external ear, scalp, mons veneris, and around the nipple in women. Grew thinks he was the first who observed them on the fingers; and has given a pretty just engraving of them, in the Philosophical Transactions. Winslow describes these last, and says, they are the ducts of glands. The processes which line the pores transmitting hairs have been long observed; but Mr. Cruikshank, from whose work this account is taken, was the first who described these processes which line the other classes of pores. Albinus takes notice of the appearance, but says that they are the roots of hairs pulled away with the cuticle or rete mucosum. The processes which line the pores would, however, from what can be collected of the opinions of

the most eminent latter anatomists, be reckoned imperforated, and described as so many blind pouches, resembling the fingers of a glove, which might be pulled out of the pores entire, by long maceration of the skin in water. Of course the cuticle and rete mucosum would, in their opinion, be reckoned every where entire; and it must be owned, that when these membranes are separated by maceration, and viewed in the microscope, there is not the least appearance of pores. Haller, Albinus, and Meckel, are of opinion, there are no pores in these membranes. None of the latter anatomists have been able to discover Lewenhoek's scales, of which he believed the cuticle was composed, and between whose interstices, or loose edges, the fluids passed into the body, or passed out. Malpighi's and Ruysch's perforations of the rete mucosum have been sought for with no better success. Mr. Cruikshank says, that, after some pains, and assisted by pretty good microscopes, he was not able to discover perforations in the cuticle, or rete mucosum. It is true, that by macerating the tongue of a calf in water for a considerable time, an appearance of pores may be produced in the rete mucosum; and it is as true, that the same appearance may be produced in the cuticle. But when the one appears perforated, the corresponding surface in the other is always not so; and where the processes are short, and easily separated from one another, neither cuticle nor rete mucosum appear to be perforated; and both may be demonstrated to have their own processes. Malpighi first taught that the rete mucosum was porous. Haller is of the same opinion; also asserting from Du Hamel that the rete mucosum in the feet of many birds, he particularly instances the ostrich, is perforated. Mr. C. says, he has seen those talked of perforations, and is convinced, that, as in the tongue of the calf, these are only vaginulæ, or sheaths for the villi, and cannot be demonstrated by any means to be open at top.

Though he has not found pores in either cuticle or rete mucosum, he believes, nevertheless, that they certainly exist. Albinus, and Meckel, particularly the last, are disposed to believe, that whatever fluids are perspired, or whatever are absorbed by the skin, must equally soak through the cuticle, as the vapour of warm water does through dried leather. Albinus even doubts, whether the transpired fluids do not ooze through the coats of the extreme arteries themselves, as vapour, and are afterwards condensed into sweat. "Quid ni," says he, "penetraret, per mollia nostra, humidaque, quum calentis aquæ vapor, per durum, siccumque corium, eo modo penetret?" Professor Meckel uses nearly the same language. Talking of the cuticle, in the Memoirs of the Academy of Berlin, he says, "Quoiqu' inaccessible aux vaisseaux, sa nature est pourtant telle, qu'il transmet le liquide, dont il est imbû, à peu près, comme pourroit le faire un cuir mince humectè." He also observes, that though in the palms of the hand of blacksmiths, and in the soles of the feet in travellers, the cuticle consists of many layers, and is sometimes a quarter of an inch thick, still perspiration takes place on these surfaces. Did the fine perspiring vessels reach the cuticle of the foot in the one instance, or of the hand in the other, the weight of the body, or the recoil of the hammer, he thinks must crush them to pieces.

The reasons which would favour the opinion that there are pores organized, connected with the extremities of the exhalent arteries, in the cuticle and rete mucosum, which, however invisible in the dead separated cuticle, still exist, and are sufficiently dilated in the erected state of the extremities of the vessels of the living and perspiring skin, are the following:

When a piece of cuticle falls off from the cutis, some of the hairs go with it, and some remain with the cutis. Those hairs certainly perforated the cuticle, yet in the microscope not the least vestige of these perforations can be traced. In places where the hairs either do not exist, or where they are invisible, where, however, the pores are very numerous, as on the nose and some parts of the external ear, no perforations can be traced in the separated cuticle; though the sebaceous matter could formerly be pressed from the cavities of these pores on the nose, in form of a small worm, of some considerable length. The processes themselves are frequently torn off, and remain with the pores of the cutis, yet no appearance of perforation is seen in the separated cuticle of any such part of the skin. The dead cuticle, and even the callous living cuticle, swell from water, though the sound parts of living cuticle do not seem to undergo any change from lying long in water. The cuticle of the palms of the hands, and of the soles of the feet, seem at least to imbibe moisture; but the cuticle on the opposite sides of the hands and feet do not appear to have undergone any change. This may be seen in the hands of a woman who washes linen; and the reason of it is, that in the palms of the hands and soles of the feet there are a great many layers of dead cuticle, which still adhere to the living by the attraction of cohesion, and which certainly absorb warm water, thicken, and are thrown into wrinkles. When poultices are applied to these parts, the same appearances are seen. If dead cuticle swells in water, its pores will inevitably become invisible. Farther, respecting the soaking of fluids through cuticle and rete mucosum, let it be remembered, that in many fevers the skin is for a long time parched and dry, though it looks red and feels hot; the last circumstances prove, that the blood is determined to the skin in greater quantity than at other times, yet the fluids do not sweat out, and much less transude. Many people, notwithstanding their using exercise, even in hot weather, when the fluids must be determined to the skin, do not sweat. Vesications which take place from burns, from other accidents, or from the constitution, have been left to themselves; the fluid has not appeared sensibly to evaporate; they have remained apparently of the same size, for eight or ten days, without the cuticles ever

feeling moist. When a bit of dead skin, with its cuticle sound, and adhering, is exposed to air, it will be many weeks in drying; and were not the cuticle to separate by putrefaction, would probably never dry at all. When cuticle happens to be rubbed off, in the dead body, the skin dries immediately. Though the legs in œdema are loaded frequently with lymph, not a drop transudes through the cuticle, unless the distention has been so great as to tear it, which rarely happens. Is it probable that the same cuticle should be the most permeable and most impermeable to fluids, of any substance, at one and the same time?

But as pores are allowed to exist, why does not the fluid of vesication escape by the pores, though it may not transude? These pores Mr. Cruikshank believed were in the processes of cuticle and rete mucosum, which lined the pores of the skin. If one press the finger about the middle in hot weather, or apply a ligature, the perspirable matter will be forced out at the pores on the tops of the fingers, in round drops, at regular distances, on the spiral ridges, like the secretion of the tarsal glands of the eyelids, after they have been immersed in spirits. In the latter case, the equal pressure of the surrounding fluid may oblige the secretion to put on the appearance of round drops. But Albinus's reasoning does not appear just, when he says, the fluid perspires, in the former instance, from every part of the skin, and is collected into drops by the equable pressure of the surrounding atmosphere. The drops appear at the orifices of the pores, and no where else; and their rounded form depends on their being accumulated in a round cavity, the orifice of the secondary pore. This makes it more than probable, that the perspiring pores, and, from analogy, the absorbing pores, are in the processes of the cuticle and rete mucosum, which line the secondary pores of the cutis; and not in that apparent external interstitial surface of the cuticle itself, placed between the mouths of the external pores. What farther confirms this idea is, that the parts most porous sweat most, and will be found to absorb most. The tip of the nose in warm weather, the head, the armpits, the soles of the feet, and palms of the hands, sweat most. Now, it is contended that there are pores in the cuticle and rete mucosum, therefore it is proper to enquire why the cuticle does not allow the fluid of vesication to escape. —When cuticle is detached by vesication, its processes must be compressed against its internal surface, and the pores of course will be shut. When œdema distends a limb, the fluids do not escape for another reason. The extreme arteries, which exhale on the skin, are, probably, compressed by the water, and the cellular membrane become turgid by exhalation, from more internal branches; and besides, sweating is a secretion which cannot be conceived consistent with the distended state of the cold skin; we have therefore no moisture, in general, from such surfaces. The skin has been exposed to heat, sufficient to convert its fluids into vapour, and as vapour is allowed to be more penetrating than fluid, it should of course have dried quickly, but it did not. Now, if the villi are either supposed to be collapsed, or the processes compressed, one may see some reason why no moisture appeared on the skin. A state of erection, distention, and perfect freedom may be necessary to perspiration, and easily obtained in the living body; but from the relaxation or compression of the villi, any process similar to perspiration may be impossible, notwithstanding the action of heat, which could not make these vessels exert a power consistent only with life. The surface of the cuticle is always covered with an unctuous or oily secretion; this is very conspicuous in the skin of the Negro, and makes it still more improbable that watery fluids soak through it: this may be one reason why it does not suffer the cutis to dry. The cuticle of the hands and feet, in the living body, seem to imbibe moisture, and become softer; but it is probably in consequence of its having less living principle than that of other parts.

That it allows of the sweat's passing through, may be easily accounted for, though the soaking of fluids through it should be denied; for admitting that in the palms of the hands, or soles of the feet, there may be many layers of cuticle, still it is most probable, that the last formed corresponds in every respect to the first formed and intermediate layers, and that pores are opposite to pores, and connected with each other.

Besides, the villi appear to be lengthened, as the cuticle becomes thicker. Dr. Hunter has described and delineated, in the London Medical Essays, white filaments passing between the cuticle and cutis. These are most remarkable in the sole of the foot, in the human subject. He suspects them to be vessels of perspiration, continued even to the cuticle. If they are vessels, it corresponds with the idea of vessels becoming larger and longer, in proportion as the cuticle becomes thicker. For these filaments are more easily demonstrated on the heel, or ball of the great toe, where the cuticle is thickest, than any where else. We have been informed, that it has lately been discovered, that these filaments were nerves. That the nerves become larger, but on account of more acute sensation, or greater action in a part, appears a sufficient reason for rejecting the idea of larger nerves going to an insensible and nearly passive membrane. If these filaments be not vessels, from analogy to the other parts of the internal surface of cuticle, it may rather be suspected they were exceeding fine processes of the cuticle and rete mucosum, which line the smallest pores of the true skin; and if these processes be elongated, and go inwards, as the cuticle thickens, while at the same time they serve the same purposes as the ducts of glands, it comes to the same thing, as if more of the vessels themselves had been elongated outwards.

If these filaments be really processes of the cuticle and rete mucosum, then three classes of processes in these membranes can be demonstrated. The first line the pores, through which

the hairs pass; these are the longest, and generally have the largest diameter. The second class are easily distinguished on the inside of the cuticle, which cover the palms of the hands or soles of the feet, or indeed on any part of the cuticle; they line those pores described by Grew, and which Winslow calls the ducts of glands; they are short, compared to the former, are transparent on the sides, and have a white line in the centre, which are not well understood; they appear, in regular order, on those parts of the cuticle which correspond to the parallel, or spiral ridges of the cutis. The above mentioned filaments, perhaps, constitute the third class, are longer than the last, and more slender than any of the former.

In order to make it probable that cuticle is a substance which may be pervaded by fluids, though it has no pores, anatomists have adopted one of two theories, respecting its formation. The first is, that it consists of the callous extremities of the vessels of the skin, reduced to this state by the friction which perpetually takes place between the surface of the body, and substances coming in contact with it. Morgagni adopted this opinion.

The second is, that cuticle and rete mucosum were originally, and still are, exudations of mucus from the ends of the vessels of the skin; that this mucus is dried and hardened by the external atmosphere into a membrane. This last opinion has been supported by Professor Meckel, who observes, in confirmation of his opinion, that the black membrane in the rete mucosum of the Negro may still be dissolved in water, like mucus, by maceration. There is something else in cuticle; nor does its known properties correspond with these theories. If the friction of external substances rendered the ends of the vessels of the skin callous, whence have we cuticle so perfect in the earliest state of the tender fœtus, hanging in a warm liquid, more fit for dissolving, as one would imagine, than producing callosity? If the cuticle, on the other hand, is merely concreted mucus, whence should the dead cuticle remain months in water without dissolving, or becoming putrid? The hoofs, nails, and cuticle, of animals, are supposed to be similar substances, and always come away together after maceration in water; yet the hoof in the slink calf is almost an inch thick, while the cuticle is nearly the same as it is afterwards in open air.

No part of the skin of a living animal is inorganic and not possessed of life. If the cuticle, though an insensible membrane, were not alive, and possessed of irritability, why should touching it with caustic, which deprives other parts of life, and makes them drop off, have the same effect on the cuticle.

If a bit of cuticle is touched slightly with moist lunar caustic, it soon becomes black, and in a day or two drops off, shewing a new surface, in every respect like the former. This is not new cuticle, so quickly regenerated, but the cuticular surface of rete mucosum, which has the same appearance, and the same properties, as the cuticle. Spirit of nitre dropt on the cuticle turns it yellow, and produces, though more slowly, the same effect as the lunar caustic does. The substance of the teeth, like the cuticle, has been supposed to have no vessels; and there are several circumstances which favour this opinion: yet in attempting to saw a tooth, in the living body, the patient complains of pain the moment the saw gets through the enamel. If there be nerves in the bony part of a tooth, there can be no doubt of its also having vessels. Cartilages covering the ends of bones, in the full grown animal, have not the least vestige of vessel that can be demonstrated; but cartilage may be absorbed as well as bone; and if in the diseased state, it is most probably vascular, it must have been so in the sound state. Next to the cuticle lies the rete mucosum, so called from its imagined perforations, and consequent resemblance to a net, and that it consisted only of mucus. It was not known to the ancients; and as the discovery belongs to Malpighi, it is sometimes called rete Malpighi; he first discovered it in the tongue, and afterwards transferred it to the skin; he calls it "corpus mucosum et reticulare," and, after describing it, says,—"ex quo deduco non incongruam forte nigredinis Æthiopum causam: certum enim est ipsis cutim albam esse sicuti et cuticula, unde tota nigredo a subjecto mucoso et reticulari corpore ortum trahit." Riolan, before him, thought he had discovered the cause of the black colour in the Negro, and says it was in the epidermis, and did not go so deep as the true skin; but the epidermis and rete mucosum were not then distinguished. The scarf skin is colourless; the rete mucosum, on the contrary, is of different colours in different climates, and in different persons in different states of the body. The apparent colour of the skin entirely resides in this membrane; it is black in the Negro, copper-coloured in the Mulatto, yellow in the Egyptian, and white in the Albino, and in the inhabitants of cold climates. It, in the last, becomes brown in summer from the heat of the sun, and particularly in those who at the same time are exposed to the reflection of his rays from the surface of water, as in sea voyages, and similar situations. In those where its natural colour is white, it never changes if they are always within doors when the sun is up; and in European climates, if it has become brown during the summer heat, it becomes white again during the winter's cold. Even in those who live in cold climates its colour is sometimes naturally brown or yellow. It becomes black or dark brown in the areola round the nipples of women who are somewhat advanced in pregnancy, and is then one of the surest marks of their being with child, and constantly resorted to by the medical practitioner. The colour of this membrane is transmitted from the parents to their children, and is wonderfully altered by crossing the breed; the offspring therefore of a black man, by repeated intermarriages with white women, will, in the fourth generation, become white; and the converse of this is equally true. In order to ascertain whether

the rete mucosum was vascular, Mr. Cruikshank instituted several experiments on the skin of those who died of the natural small-pox.

He macerated some portions of skin in putrid water for a week, during the heat of the summer; the spirits with which they had been previously impregnated made them resist the effects of this water longer. Cuticle and rete mucosum were already turned down; and upon the eighth or ninth day, he found he could now separate a vascular membrane from the cutis, in which were also situated the injected small-pox pustules. These last consisted of circles of long floating villi at the circumference, but of a white uninjected substance in the centre. This central part Mr. Hunter had previously said was a slough, formed by the irritation of the variolous matter. The surface of the skin from whence this membrane was separated was elegantly porous. The pores now appeared exceedingly more numerous, and this surface of the skin was still tough and shining. From the vast number of pores now visible, he inferred, that the processes of the cuticle and rete mucosum must be also more numerous than we are aware of; and many of these processes must be invisible in the microscope, from their exility and delicate texture, though their corresponding pores are visible. He macerated the same skin for four or five days more, and separated another membrane, more delicate than the former, but also vascular: the former he easily preserved; the latter, attracted by the instrument which separated it, or unable to bear the agitation of the water or spirits in which it was separated, constantly broke down; but the corresponding surface of the skin was still tough and shining; the pores were now much larger and more distinct than before, which convinced him that the appearance was natural, and that the skin had sustained no real injury in the process.

Thus, it appears, that Mr. C. has demonstrated five kinds of skin instead of three, commonly supposed. The three first are evidently cuticles, and the two last, most probably, are formed into cuticle, and, like the second and third, are to succeed the first, which is perpetually falling off in small portions, like scales,—the only circumstance which seems to favour Lewenhoek's doctrine, that the cuticle is formed of scales.

In order to be perfectly understood respecting these five membranes, it may again be observed that cuticle, commonly so called, makes the first; the rete mucosum is double, and makes the second and third; the first vascular membrane in which the small-pox pustules are chiefly seated, makes the fourth; and the membrane, which may be separated some days after the separation of the last, by continuing the maceration, and which shews the pores still larger, makes the fifth. These two last membranes, it is probable might easily be detected in the skins of those who die of the measles, scarlet fever, or other eruptive diseases, as well as in the small-pox skin; these eruptive diseases do not create, but demonstrate, these membranes, in consequence of the great determination of blood, in these cases, to the skin.

The skin itself was given to man not only for feeling, in a general sense, but for perspiration, absorption, and particularly for touch, in which he excels all other animals, and which resides principally in the tips of the fingers. He was intended for examining, reasoning, forming a judgment, and acting accordingly; he was fitted by this sense to examine accurately the properties of surrounding bodies, not capable of being examined by his other senses. This, among other reasons, was one why he was made erect, that the points of his fingers should not be made callous, or less sensible, by walking on them.

The skin of human bodies is always of a white colour, in the dead body, let the colour of the rete mucosum be what it may; it is extremely full of pores, and extremely vascular; a child in full vigour comes into the world, from this circumstance, scarlet; it is endowed with intense sensibility, almost all the pain, in the different operations of surgery, is past when we have divided the skin. Some parts of the skin have more feeling than others; the lips, for example, as Haller says, "ad basia destinata." The glans clytoridis, and the glans penis, with a similar intention; there, though the nerves are not so large as in some other parts, they are longer, more numerous, and endowed with more exquisite feeling; but where the common offices of life merely are intended, the marks of superior feeling or touch, in the skin, are the projections, above the common surface, of those packets of arteries, veins, and absorbents, called villi; the nerves are there not only also longer, but larger, as in the points of the fingers and toes.

We are not certain that the skin is muscular, but it has properties very like those of muscle; it contracts, relaxes, and even vibrates, in some places, on certain occasions. It is extremely distensible; the skin of the perinæum has stretched in labour from a quarter of an inch to six inches. It is also extremely elastic, and instantly after labour has returned again to the original quarter of an inch; it is thickest on those parts intended by nature to bear weight or pressure; of course it is thickest on the back, on the soles of the feet, and palms of the hands. It is thinner on the fore part of the body, on the insides of the arms and legs, and where its surfaces touch opposite surfaces. It is extremely thin on the lips, and allows the colour of the blood to shine through it. It is also extremely thin on the glans penis in men, glans clytoridis in women, and on the inside of the labia pudendi. Skin dried and dressed is extremely strong and durable, and therefore employed in making harness for horses, clothing for men, and a variety of other purposes.

SKIN (Scarf). See CUTICLE and SKIN.

To SKIN. *v. a.* (from the noun.) 1. To flay; to strip or divest of the skin (*Ellis*). 2. To cover with the skin (*Dryden*). 3. To cover superficially (*Addison*).

SKI'NFLINT. *s.* (*skin* and *flint.*) A niggardly person.

SKINK. *s.* (ꝛcenc, Saxon.) 1. Drink; any thing potable. 2. Pottage (*Bacon*).

To SKINK. *v. n.* (ꝛcencan, Saxon.) To serve drink.

SKINK, in amphibiology. See LACERTA.

SKI'NKER. *s.* (from *skink.*) One that serves drink (*Dryden*).

SKI'NNED. *a.* (from *skin.*) Having skin (*Sharp*).

SKI'NNER. *s.* (from *skin.*) A dealer in skins, or pelts.

SKI'NNINESS. *s.* (from *skinny.*) The quality of being skinny.

SKI'NNY. *a.* (from *skin.*) Consisting only of skin; wanting flesh (*Shakspeare*).

To SKIP. *v. n.* (*squittire*, Italian.) 1. To fetch quick bounds; to pass by quick leaps; to bound lightly and joyfully (*Pope*). 2. *To* SKIP *over.* To pass without notice (*Bacon*).

To SKIP. *v. a.* (*esquirer*, French.) To miss; to pass (*Shakspeare*).

SKIP. *s.* (from the verb.) A light leap or bound (*More*).

SKI'PJACK. *s.* (*skip* and *jack.*) An upstart (*L'Estrange*).

SKIPJACK, in ichthyology. See GASTEROSTENS.

SKI'PKENNEL. *s.* (*skip* and *kennel.*) A lackey; a footboy.

SKI'PPER. *s.* (*schipper*, Dutch.) A shipmaster or shipboy (*Congreve*).

SKI'PPET. *s.* (probably from *skiff.*) A small boat: not used (*Spenser*).

SKIPTON, a town in W. Yorkshire, with a market on Saturday. The river Aire and the Leeds and Liverpool canal pass this town, and near it are some cotton works. It is seated in the midst of a rough mountainous district, called Craven, 22 miles N. by W. of Halifax, and 216 N.N.W. of London.

SKI'RMISH. *s.* (from *ys* and *carm*, Welsh, the shout of war; *escarmouche*, French.) 1. A slight fight; less than a set battle (*Philips*). 2. A contest; a contention (*Shakspeare*).

To SKI'RMISH. *v. n.* (*escarmoucher*, French.) To fight loosely; to fight in parties before or after the shock of the main battle (*Atterbury*).

SKI'RMISHER. *s.* (from *skirmish.*) He who skirmishes (*Ainsworth*).

To SKIRRE. *v. a.* (from ꝛcıꝑ, Saxon, pure, clean.) To scour; to ramble over in order to clear (*Shakspeare*).

To SKIRRE. *v. n.* To scour; to scud; to run in haste (*Shakspeare*).

SKIRRET, in botany. See SIUM.

SKIRT. *s.* (*skiorte*, Swedish.) 1. The loose edge of a garment; that part which hangs loose below the waist (*Shakspeare*). 2. The edge of any part of the dress (*Addison*). 3. Edge; margin; border; extreme part.

To SKIRT. *v. a.* (from the noun.) To border; to run along the edge (*Addison*).

SKI'TTISH. *a.* (*skye*, Danish; *schew*, Dutch.) 1. Shy; easily frightened (*L'Estr.*). 2. Wanton; volatile; hasty; precipitate (*Hudibras*). 3. Changeable; fickle (*Shakspeare*).

SKI'TTISHLY. *ad.* (from *skittish.*) Wantonly; uncertainly; fickly.

SKI'TTISHNESS. *s.* (from *skittish.*) Wantonness; fickleness.

SKITTLES. SKUTTLES. Perhaps the proper word should be *scuttles*, from *scuttle*, to precipitate, whelm or overwhelm. Johnson does not give the word in either mode of spelling; but under the term *loggats*, which he uses synonymously, he writes it *kittles*, though even this word does not occur in its proper place. "Loggats," says he, from Hanmer, "is the ancient name of a play or game which is one of the unlawful games enumerated in the thirty-third statute of Henry VIII. It is the same which is now called kittle-pins, in which boys often make use of bones instead of wooden pins, throwing at them with another bone instead of bowling." Walker writes the word *skittles*; but observes, "this word is in no dictionary that I have seen, nor do I know its derivation;" and adds, "what Johnson means by kittle-pins neither he nor any other of our lexicographers informs us."

A game played with nine pins or pieces of wood of a sugar-loaf form, placed in five lines, the middle line having three pins, the next on either side two, and the extreme lines one. These are bowled or tipped at with a massy and biased bowl, and the winner of the game is he who knocks down the exact number agreed upon in the fewest number of throws.

The chief rules are the following. The bowler must stand with one foot at the mark, and thence deliver his bowl fairly out of his hand; which bowl should run upon the board, fixed for that purpose, before it arrives at the frame; for if the bowl do not run along the board, or at least touch it in some part, the bowler loses the benefit of bowling.

If he throw his bowl so as to make it run double (as it is commonly called) and one of the opposite party calls out *a foul bowl* before it reaches the pins, he must bowl again; but if the frame be reached before the call is made, whatever numbers are bowled down must be scored.

If a bowl run clearly through the frame, and in its return strike a standing pin, and immediately after a rolling or live pin runs against the falling pin, the whole is held fair, since the live pin hits the other pin last.

If a live pin roll against a standing pin, and the bowl, on its return, comes against the falling pin before it is down, it is deemed an unfair pin, because the bowl struck it last.

If the bowl run through the frame and knock at the head-board, although it may have bowled down many pins, none are allowed fair.

If the bowl run through, or on the outside of the frame, and knock, and then run round the other side of the frame without crossing any part of it, or touching any of the live pins, the bowler must stand to take his tip with one foot upon the spot where the bowl stopped. And in tipping from such place he must not

strike the ground with the bowl before it hits the pins; if he do, he loses all the pins he may strike down.

If in tipping the bowl is caught or stopped by one of the opposite party, who, in so doing, stops or impedes a live pin, the party who stops loses one from his own score; because he prevented the tipper from receiving the benefit which might have arisen from a live or rolling pin.

If the opposite party take up the bowl in order to prevent it from running amongst the pins, and letting it slip out of his hands, hits any of the pins, such party loses one for so doing.

If the tipper give a sweep round with his hand and bring down any pins by means of his hand or coat-sleeve, that is deemed unfair, and he must lose one pin. The bowl is always to be clearly and fairly delivered from the hand, both in bowling and tipping.

In tipping care should be taken not to jump into the frame immediately after, as in this case the player is not allowed any of the pins he tips.

If the player bowl and tip for a limited number, at the close of the game, and throw down more than are wanted, he must go for nine.

In the grounds where these rules are observed, a disinterested person is generally appointed to score the game, and in disputes his decision is final.

To bowl well requires much practice, yet some instruction may also be found useful. Let the player hold the bowl in his right hand, with the bias side from him, and his left foot advanced before the right, which must be at the mark, his body bending towards the frame, but in an easy position. Then, with an equal motion, let him throw the bowl along the board with sufficient strength to reach the frame: the left hand side of the first pin he should endeavour to hit with the bowl itself, and in accomplishing this he will be tolerably certain of bringing down four or five by the fall of the pin thus struck. But he should not aim at the first pin in a straight direction, but make the bowl form a curved line; by which it will lose something of its force, and strike the pins with the greater certainty of success.

In learning to tip the beginner should hold the smaller circumference or opposite side of the bias in the palm of his hand, grasping it very strong with his fingers, as few pins can be tipped when the bowl is loosely held. He must place his left foot quite clear of the frame between the first and fifth pin, and his right foot behind him in an easy position, and in such direction that he may with ease hit his pins in the following manner. He must strike his first or second pin in the middle or largest part, and with the same motion, and in the same instant of time deliver his bowl at the fourth or bowl-pin. Hitting the first pin, not quite full, he forces it against the middle or fifth pin, thence to the seventh, whence it frequently rebounds to the eighth without any roll. The second pin, if struck well, will knock down the third; and the fourth, or bowl-pin, will strike the sixth; and if the pins be good, the ninth is often brought down by some of the rolling ones. When the learner is to tip for four upon game, he should choose the eighth, seventh, sixth, and fourth pins; placing his left foot by the side of the frame, with his toe nearly in a line with the bottom of the seventh pin, and his right foot behind him: he should strike the three side pins with the same motion, and at the same time urge the bowl against number four. To tip for five, let him place his left foot a little to the left of the pin number nine, and his right foot behind. He should strike the ninth pin to hit the seventh, the fifth to hit the fourth, and the bowl must knock down the sixth.

The just proportion of a skuttle is fifteen inches round at the base, and twelve inches high. The bowl should be eighteen inches in circumference, and each angle of the frame for the pins three feet four inches.

SKONCE. *s.* See SCONCE (*Carew*).

SKREEN. *s.* (*escrein*, French.) 1. A riddle or coarse sieve (*Tusser*). 2. Any thing by which the sun or weather is kept off (*Prior*). 3. Shelter; concealment (*Dryden*).

To SKREEN. *v. a.* (from the noun.) 1. To riddle; to sift. 2. To shade from sun or light, or weather. 3. To keep off light or weather (*Dryden*). 4. To shelter; to protect.

SKUE. *a.* Oblique; sidelong (*Bentley*).

To SKULK. *v. n.* To hide; to lurk in fear or malice (*Dryden*).

SKULL, in anatomy. See BONES, CAPUT, CRANIUM, &c.

SKULLCAP, in botany. See SCUTELLARIA.

SKUNK, in mastiology. See VIVERRA.

SKUTTLES. See SKITTLES.

SKY. *s.* (*sky*, Danish.) 1. The region which surrounds this earth beyond the atmosphere. It is taken for the whole region without the earth (*Roscommon*). 2. The heavens (*Davies*). 3. The weather; the climate (*Shakspeare*).

SKY'EY. *a.* (from *sky*.) Ethereal (*Shaks.*).

SKY'COLOUR. *s.* (*sky* and *colour*.) An azure colour; the colour of the sky (*Boyle*).

SKY'COLOURED. *a.* (*sky* and *colour*.) Blue; azure; like the sky. See OPTICS.

SKY'DYED. *a.* (*sky* and *die*.) Coloured like the sky (*Pope*).

SKY'ED. *a.* (from *sky*.) Enveloped by the skies (*Thomson*).

SKYE, an island of Scotland, one of the largest of the Hebrides. It is 45 miles long, and about 22 broad. The S.E. end is separated from Invernessshire (to which it belongs) by a narrow channel, called the inner sound; in the most narrow part of which, named the Kyle, cattle are made to swim across. This side of the island swells gradually from the shore, in a verdant slope, over which are seen the naked hills of Strath; and above these rises the rugged top of Cullin or Cuchullin. To-

ward the S.W. are a series of rude mountains, black and red, as if discoloured by the rage of fire; and on the E. a long extent of lofty hills. There is, notwithstanding, a great proportion of level ground, with excellent pasturage; and it has numbers of deer and different kinds of game. It abounds with limestone, marble, &c. but the basaltic columns, resembling the Giant's Causeway in Ireland, are its greatest curiosity. A cave, at the E. end of the island, afforded an asylum, in 1746, to the disappointed pretender, and his faithful guide, for two nights. Many thousands of black cattle are annually exported hence. Some small horses are bred, and a great quantity of kelp is manufactured here. Portree is the chief place.

SKYFLOWER, in botany. See CINERARIA.

SKY'ISH. *a.* (from *sky*.) Coloured by the ether; approaching the sky (*Shakspeare*).

SKY'LARK. *s.* (*sky* and *lark*.) A lark that mounts and sings. See ALAUDA.

SKY'LIGHT. *s.* (*sky* and *light*.) A window placed in a room, not laterally, but in the cieling (*Arbuthnot and Pope*).

SKY'ROCKET. *s.* See ROCKET.

SLAB. *s.* 1. A puddle (*Ainsworth*). 2. A plane of stone, or of timber; as a marble or an elm slab.

SLAB. *a.* Thick; viscous; glutinous (*Shakspeare*).

To SLA'BBER. *v. n.* (*slabben, slabberen*, Dutch.) 1. To let the spittle fall from the mouth; to drivel. 2. To shed or pour any thing.

To SLA'BBER. *v. a.* (*slaver* is the word used.) 1. To smear with spittle (*Arbuthnot*). 2. To shed; to spill (*Tusser*).

SLA'BBERER. *s.* (from *slabber*.) He who slabbers; an idiot.

SLA'BBY. *a.* 1. Thick; viscous: not used (*Wiseman*). 2. Wet; floody: in low language (*Gay*).

SLACK. *a.* (slaec, Sax. *slaken*, Islandic.) 1. Not tense; not hard drawn; loose (*Arb.*). 2. Relaxed; weak; not holding fast (*Milton*). 3. Remiss; not diligent; not eager (*Hooker*). 4. Not violent; not rapid (*Dryden*). 5. Not intense (*Mortimer*).

To SLACK. *To* SLA'CKEN. *v. n.* (from the adjective.) 1. To be remiss; to neglect (*Deuteronomy*). 2. To lose the power of cohesion (*Moxon*). 3. To abate (*Milton*). 4. To languish; to fail; to flag (*Ainsworth*).

To SLACK. *To* SLA'CKEN. *v. a.* 1. To loosen; to make less tight (*Dryden*). 2. To relax; to remit (*Davies*). 3. To ease; to mitigate (*Spenser*). 4. To remit for want of eagerness (*Milton*). 5. To cause to be remitted; to make to abate (*Hammond*). 6. To relieve; to unbind (*Denham*). 7. To withhold; to use less liberally (*Shakspeare*). 8. To crumble; to deprive of the power of cohesion (*Mortimer*). 9. To neglect (*Daniel*). 10. To repress; to make less quick or forcible (*Addison*).

SLACK. *s.* (from the verb.) Small coal; coal broken in small parts.

SLA'CKLY. *ad.* (from *slack*.) 1. Loosely; not tightly; not closely. 2. Negligently; remissly (*Shakspeare*).

SLA'CKNESS. *s.* (from *slack*.) 1. Looseness; not tightness. 2. Negligence; inattention; remissness (*Shak.*). 3. Want of tendency; tardiness (*Sharp*). 4. Weakness; not force; not intenseness (*Brerewood*).

SLAG, a technical term used among smelters and workers in minerals to express any hard, vitrescent, generally coloured and opake, mass; produced by the fusion of any stony or metallic mixture. It generally consists of the gangue or matrix of the ore, together with any saline or earthy flux that may have been used. Thus the slag of iron founderies is for the most part composed of the earthy portion of the ore, of the lime used as a flux, and the whole deeply coloured with a part of the oxyd of iron which has escaped reduction. A slag differs from a scoria in being more dense, and more completely vitrified, the scoria being lighter and porous. When the slag is very opaque and heavy, it contains a considerable quantity of metallic oxyd, so that in improved smelting works it is often worth while to work over again, with fresh reducing matter, the slags of former operations, conducted less skilfully. In some places the slags of founderies are broken into lumps and used for mending roads, for which it makes an excellent material when a little worn down, being very hard and impenetrable by water.

SLAIE. *s.* A weaver's reed (*Ainsworth*).

SLAIN. The participle passive of *slay*.

To SLAKE. *v. a.* (from *slack*, *Skinner*; from *sloch*, Islandic, to quench, *Lye*.) To quench; to extinguish (*Crashaw*).

To SLAKE. *v. n.* (from *slack*.) 1. To grow less tense; to be relaxed (*Davies*). 2. To go out; to be extinguished (*Brown*).

To SLAM. *v. a.* (*schlagen*, Dutch.) To slaughter; to crush.

To SLA'NDER. *v. a.* (*esclaundrie*, French.) To censure falsely; to belie (*Whitgift*).

SLA'NDER. *s.* (from the verb.) 1. False invective (*Ben Jonson*). 2. Disgrace; reproach (*Shakspeare*). 3. Disreputation; ill name (*Shakspeare*).

SLA'NDERER. *s.* (from *slander*.) One who belies another; one who lays false imputations on another (*Taylor*).

SLA'NDEROUS. *a.* (from *slander*). 1. Uttering reproachful falsehoods (*Shakspeare*). 2. Containing reproachful falsehoods; calumnious (*South*).

SLA'NDEROUSLY. *ad.* (from *slanderous*.) Calumniously; with false reproach (*Daniel*).

SLANG. The preterit of *sling*.

SLANT. SLA'NTING. *a.* (from *slanghe*, a serpent, Dutch, *Skinner*.) Oblique; not direct; not perpendicular (*Blackmore*).

SLA'NTLY. SLA'NTWISE. *ad.* Obliquely; not perpendicularly; slope (*Tusser*).

SLAP. *s.* (*schlap*, Germ.) A blow (*Thom.*).

SLAP. *ad.* (from the noun.) With a sudden and violent blow (*Arbuthnot*).

To SLAP. *v. a.* (from the noun.) To strike with a slap (*Prior*).

SLA'PDASH. *interj.* (from *slap* and *dash*.) All at once (*Prior*).

To SLASH. *v. a.* (*slasa*, to strike, Islandic.) 1. To cut; to cut with long cuts. 2. To lash. *Slash* is improper (*King*).

To SLASH. *v. n.* To strike at random with a sword; to lay about him (*Pope*).

SLASH. *s.* (from the verb.) 1. Cut; wound (*Clarendon*). 2. A cut in cloth (*Shakspeare*).

SLATCH. *s.* (a sea term.) The middle part of a rope or cable that hangs down loose.

SLATE, in mineralogy, a species of ARDESIA, which see.

To SLATE. *v. a.* (from the noun.) To cover the roof; to tile (*Swift*).

SLA'TER. *s.* (from *slate*.) One who covers with slates or tiles.

SLA'TTERN. *s.* (*slaetti*, Swedish.) A woman negligent, not elegant or nice (*Dryden*).

SLA'TY. *a.* (from *slate*.) Having the nature of slate (*Woodward*.)

SLAVE. *s.* (*esclave*, French.) 1. One mancipated to a master; not a freeman; a dependant (*Addison*). 2. One that has lost the power of resistance (*Wilkins*).

The Romans called their slaves *servi*, from *servare*, to keep, or save; as being such as were not killed, but saved to yield money either by sale, or by their work. Though other authors are of opinion, that the Roman name *servi* might come from that of *serbi*; as that of slaves from Sclavi, a people.

We find no mention of slaves before the deluge, but immediately after, viz. in the curse of Canaan, Gen. ix. 25. whence it is easily inferred, that servitude commenced soon after that time; for in Abraham's days we find it generally established. Some will have it to have commenced under Nimrod, because it was he who first began to make war, and of consequence to make captives; and to bring such as he took either in his battles, or irruptions, into slavery.

Among the Romans, when a slave was set at liberty, he changed his name into a surname; he took the nomen or prenomen of his master, to which he added the cognomen he had been called by when a slave. See NAME. By the civil law, the power of making slaves is esteemed a right of nations, and follows, *jure gentium*, as a natural consequence of captivity in war.

This is the first origin of the right of slavery assigned by Justinian, Inst. i. 3, 4. whence slaves are called *mancipia quasi manu capti*.

The Lacedemonians, say some, or as others say, the Assyrians, first introduced the practice; which the Romans not only approved of, but they even invented new manners of making slaves; for instance, a man born free among them might sell his freedom, and become a slave. This voluntary slavery was first introduced by a decree of the senate, in the time of the emperor Claudius, and at length was abrogated by Leo.

The Romans had power of life and death over their slaves, which no other nations had: but this severity was afterwards moderated by the laws of the emperors; and by one of Adrian, it was made capital to kill a slave without a cause.

The slaves were esteemed the proper goods of their masters, and all they got belonged to them: but if the master were too cruel in his domestic corrections, he was obliged to sell his slave at a moderate price.

As slavery was not formally abolished by the gospel, the custom of keeping slaves lasted a long time in Christendom. In the time of Louis le Gros, they were so numerous in Egypt, that it was found a difficult matter to quell a body of them, who had made head against their masters: yet Bartolus, who lived in 1300, observes, there were none left in his days.

For other particulars respecting the wretched condition of the Roman slaves, see the article Δουλος, in Parkhurst's Greek Lexicon: a due acquaintance with such particulars enables a reader to enter into the full meaning and spirit of many passages in the New Testament, such as 1 Cor. vii. 21, 22, 23. Eph. vi. 5. 2 Pet. ii. 19, &c.

Pure and proper slaves do not, nay cannot, subsist in England; such, that is, whereby an absolute and unlimited power is given to the master, over the life and fortune of the slave. And indeed, it is repugnant to reason, that such a state should subsist any where; and the law of England abhors, and will not endure, the existence of slavery within this nation, so that when an attempt was made to introduce it, by statute 1 Edward VI. cap. 3, which ordained, that all idle vagabonds should be made slaves, and fed upon bread and water, on small drink; and refuse meat; should wear a ring of iron round their necks, arms, or legs; and should be compelled by beating, chaining, or otherwise, to perform the work assigned them, were it never so vile; the spirit of the nation could not brook this condition, even in the most abandoned rogues; and therefore this statute was repealed in two years afterwards, by statute 3 and 4 Edward VI. cap. 16. And now it is laid down, that a slave, or negro, the instant he lands in England, becomes a free man, that is, the law will protect him in the enjoyment of his person and his property. Yet, with regard to any right which the master may have lawfully acquired to the perpetual service of John, or Thomas, this, says Blackstone, will remain exactly in the same state as before (what that right is we shall presently see): hence too it follows, that the infamous and unchristian practice of withholding baptism from negro servants, lest they should thereby gain their liberty, is totally without foundation, as well as without excuse. The law of England acts upon general and extensive principles: it gives liberty, rightly under-

stood, that is, protection, to a Jew, a Turk, or a heathen, as well as to those who profess the true religion of Christ; and it will not dissolve a civil obligation between master and servant, on account of the alteration of faith in either of the parties; but the slave is entitled to the same protection in England before, as after baptism; and whatever service the heathen negro owed of right to his American master, by general not by local law, the same (whatever it be) is he bound to render when brought to England and made a Christian.

In the celebrated case of James Somersett, it was decided, that a heathen negro, when brought to England, owes no service to an American, or any other master. James Somersett had been made a slave in Africa, and was sold there: from thence he was carried to Virginia, where he was bought, and brought by his master to England.

Here he ran away from his master, who seized him and carried him on board a ship, where he was confined, in order to be sent to Jamaica to be sold as a slave. Whilst he was thus confined, a habeas corpus was granted, ordering the captain of the ship to bring up the body of James Somersett, with the cause of his detainer: the above mentioned circumstances being stated on the return to the writ, after much discussion in the court of King's Bench, the court were unanimously of opinion, that the return was insufficient, and that Somersett ought to be discharged.

In consequence of this decision, if a ship laden with slaves was obliged to put into an English harbour, all the slaves on board might (and Mr. Christian says ought to) be set at liberty. Though there are acts of parliament which recognise and regulate the slavery of negroes, yet it exists not in the contemplation of the common law: and the reason they are not declared free before they reach an English harbour, is only because their complaints cannot sooner be heard and redressed by the process of an English court of justice.

Liberty, by the English law, depends not on the complexion; and what was said even in the time of queen Elizabeth is now substantially true, that the air of England is too pure for a slave to breathe in.

By statute 30 George III. c. 33. (continued and amended by statute 31 George III. c. 54, 32 George III. c. 52, and subsequent acts; and explaining and amending a former statute of 29 George III. c. 66); several humane provisions were made to restrain the cruelties practised in the African slave trade, bounties were given to the masters and surgeons of ships delivering the slaves well at their destined port, &c. This, perhaps, was a happy prelude to the abolution of that detestable commerce which has been so gloriously accomplished. See also statute 35 George III. c. 90: and the Journals of the House of Commons.

An African company was also established by statute 31 George III. c. 55, for carrying on a trade between Great Britain and the coasts and countries of Africa; and a colony was for that purpose established on the peninsula of Sierra Leone. This company was intended to supersede, in time, the necessity of the African slave trade, by raising sugars there by native Africans; it being one of the conditions of the act, that the company shall not deal in nor employ slaves. The company is to last for thirty-one years from July 1st, 1791. At length, as a last act of the administration to which Mr. Fox had belonged, the abolition of the slave trade as respects the subjects of Great Britain and her colonies was effected by act of parliament in the year 1807. May this brilliant example of justice be followed by other nations. See Mr. Clarkson's most interesting History of the Abolition of the Slave Trade; or the account of that book in No. 24, of the Edinburgh Review.

To SLAVE. *v. n.* (from the noun.) To drudge; to moil; to toil (*Swift*).

SLA'VER. *s.* (*salva*, Lat. *slæfa*, Island.) Spittle running from the mouth; drivel (*Pope*).

To SLA'VER. *v. n.* (from the noun.) 1. To be smeared with spittle (*Shakspeare*). 2. To emit spittle (*Sidney*).

To SLA'VER. *v. a.* To smear with drivel (*Dryden*).

SLA'VERER. *s.* (*slabbaerd*, Dutch; from *slaver.*) One who cannot hold his spittle; a driveller; an idiot.

SLA'VERY. *s.* (from *slave.*) Servitude; the condition of a slave; the offices of a slave (*King Charles*).

SLA'UGHTER. *s.* (onplaugt, Saxon.) Massacre; destruction by the sword (*Dryden*).

To SLA'UGHTER. *v. a.* (from the noun.) To massacre; to slay; to kill with the sword (*Shakspeare*).

SLA'UGHTERHOUSE. *s.* (*slaughter* and *house.*) House in which beasts are killed for the butcher (*Shakspeare*).

SLA'UGHTERMAN. *s.* (*slaughter* and *man.*) One employed in killing (*Shakspeare*).

SLA'UGHTEROUS. *a.* (from *slaughter.*) Destructive; murderous (*Shakspeare*).

SLA'VISH. *a.* (from *slave.*) Servile; mean; base; dependant (*Milton*).

SLA'VISHLY. *ad.* Servilely; meanly.

SLA'VISHNESS. *s.* (from *slavish.*) Servility; meanness.

To SLAY. *v. a.* pret. *slew*; part. pass. *slain.* (*slaban*, Gothic; ꝑlean, Saxon; *slatchten*, Dutch, to strike.) To kill; to butcher; to put to death (*Prior*).

SLA'YER. *s.* (from *slay.*) Killer; murderer; destroyer (*Abbot*).

SLEAFORD, a town in Lincolnshire, with a market on Monday. It had formerly a castle, now in ruins, and has a large market-place, in the form of a parallelogram. It is seated on the Slea, which is navigable hence to the Witham, 18 miles S. of Lincoln, and 115 N. of London. Lon. 0. 21 W. Lat. 53. 1 N.

SLE'AZY. *a.* Weak; wanting substance.

SLED. *s.* (*slæd*, Danish; *sledde*, Dutch.) A carriage drawn without wheels (*Dryden*).

SLE'DDED. *a.* (from *sled.*) Mounted on a sled (*Shakspeare*).

SLEDGE. *s.* (ɾleeʒ, Sax. *sleggia*, Islandic.) 1. A large heavy hammer (*Moxon*). 2. A carriage without wheels, or with very low wheels; properly a *sled* (*Mortimer*).

SLEEK. *a.* (*sleych*, Dutch.) 1. Smooth; nitid; glossy (*Drayton*). 2. Not rough; not harsh (*Milton*).

To SLEEK. *v. a.* (from the adjective.) 1. To comb smooth and even (*Milton*). 2. To render soft, smooth, or glossy (*Boyle*).

SLEE'KLY. *ad.* (from *sleek.*) Smoothly; glossily (*Shakspeare*).

To SLEEP. *v. n.* (ɾleepan, Sax. *slaepen*, Dutch.) 1. To take rest by suspension of the mental powers (*Crashaw*). 2. To rest; to be motionless (*Shakspeare*). 3. To live thoughtlessly (*Atterbury*). 4. To be dead: death being a state from which man will some time awake (1 *Thess.*). 5. To be inattentive; not vigilant (*Shakspeare*). 6. To be unnoticed, or unattended (*Shakspeare*).

SLEEP. (*somnus.*) That state of the body in which the internal and external senses and voluntary motions are not exercised. The end and design of sleep is both to renew, during the silence and darkness of the night, the vital energy which has been exhausted through the day, and to assist nutrition.

Among the exhausting powers may be reckoned heat, light, motion, sound, and thought, with the exercise of reason, imagination, desire, and volition; and if to these we add sensations accompanied by pain or pleasure, we shall complete our catalogue.

When, therefore, we are to ascertain the degree exhausted by these powers, we are taught by nature to retire, that, recumbent in some sequestered spot, unmolested by light, by heat, by noise, and free from the excitements of volition, sleep may quietly steal upon our senses, and close the avenue to thought. In this situation, all the muscles, excepting the sphincters, are relaxed, and voluntary motion ceases; but not the vital and involuntary, for these, far from exhausting, serve only to recruit our strength. Such is the peristaltic motion of the alimentary canal, on which depends nutrition; such respiration, which supplies the pabulum of life; and such the motion of the heart, which distributes the energetic principle to every part of the animated frame.

When all stimulating powers, excepting those which immediately excite the vital functions, are removed, sleep first takes possession of the limbs, and blunts sensation; then impairs the recollection with the reasoning power, and finally precludes volition. If profound, it puts a total stop to all the imaginations of the mind.

Such are the phenomena of sleep. But how is it produced? What is the proximate, what the remote cause of sleep?

Mr. Townsend, rector of Pewsey, is inclined to think that there are absorbents in the cavities of the brain, as in all other cavities of the body, to take up and carry off what the exhalents have deposited; and he imagines that, during our waking hours, their activity is greater in proportion to the intensity of thought, of volition, and of muscular exertion. Should this be granted, it will follow, from the laws of the animated fibre, that these absorbents, exhausted by incessant action, will become torpid in a degree, whilst the exhalents continue to pour forth into the ventricles of the brain their viscid lymph, as happens even after death, according to Sauvages.

Hence may arise that degree of pressure on the vessels of the brain which blunts the faculties, produces a cessation of voluntary motion, and terminates in total absence of sensation.

For the occasional causes of somnolency, we may look to such as diminish the vital energy and action of the absorbents, by excess of stimulus; which may be heat, animal food, spices, spirits, opium, and either violent or long continued exertions, whether mental or muscular. Among these we find the same causes which occasion drunkenness, in its several degrees of intensity, with deep sleep and death.

Or the occasional causes, diminishing the vital energy, may be directly sedative, such as excess of cold, which is attended by insuperable desire to sleep; fear, when extreme; profuse evacuations; exhausting diseases; and whatever either diminishes the supply of blood to the vessels of the brain, such as ligatures on the carotids, and pressure on the cortical substance of the brain by plethora, or impedes the return of blood by the veins, as happens to decrepit age, and to such as are oppressed with fat.

Hoffman, when treating of sleep and wakefulness, remarks, that the tone and vigour of the brain being much diminished, partly by vigilance through the day, and partly by languid circulation of the blood by night, gives occasion to more copious exhalation of lymph, which stagnates in the vessels of the brain, and impedes the secretion of the nervous fluid. He observes, that whatever retards the circulation of the blood produces sleep, and that sleep itself retards the circulation of the blood; for, during sleep, the pulse is slow, and the respiration is both deeper and slower than when we are awake.

That during sleep the whole system is relaxed is evident, because every part of the body becomes turgid; and that some of the exhalents act more freely than the absorbents, with which they are connected, is manifested by the pearly drops of sweat standing like dew upon the face of children, or flowing from every pore of hectic patients, in the morning. To this observation it may be added, that children, and people of lax habits, sleep more than old people, or such as are distinguished for rigidity of fibre. That there is some accumulation in the vessels of the brain is rendered probable by observing, that when any one is suddenly awakened from profound sleep, he is

convulsed; weight and torpor in the head are felt for some considerable time; the senses are slow in their return, and the muscles do not readily obey volition. These symptoms are frequently rendered more remarkable when weakly subjects sleep after a full meal before the fire.

During quiescence, the absorbents, having accumulated vital energy, act with renovated vigour, and a disposition to wakefulness ensues.

Thus, this wonderful machine, by its alternate accumulation and exhaustion of energetic power, seems to resemble, in simplicity of action and contrivance, the syphon fountain, or an engine kept in motion by the alternate collection and condensation of the stream.

In support of these general assertions, Mr. Townsend adduces the phænomena attendant on apoplexy. One degree of pressure produces, he imagines, drowsiness, and a greater brings on sleep in its several stages of intensity, from that which is lightest to lethargy, apoplexy, death.

If any one retires to a sequestered spot, undisturbed by light, by noise, by pain, or mental passions; when every muscle is quiescent, and when volition ceases; when there is nothing to excite the system; his state of somnolency will be prolonged, attended first by sound and refreshing sleep, afterwards by dosing. Boerhaave relates the case of a wealthy young nobleman in Holland, who, having overdrunk himself, was, by orders from the prince of Orange, carried into a dark and quiet place, where he slept three days and as many nights, not incessantly, for he awoke often, but whenever he opened his eyes, believing it to be the middle of the night, he turned round and dosed again.

Hence it should appear, that sleep may arise from either exhausted energy, or want of excitement in the absorbent system.

Many animals, secluded from light, heat, and the free access of atmospheric air, dose through the whole winter. In this case, the vital functions are scarcely perceptible; for although the lamp of life be not extinguished, it burns dim; the animal functions are suspended, and the natural functions are nearly so; for nothing passes either by urine or by stool, little escapes by perspiration, and, in the torpid state, digestion ceases. In this condition of the animal, little oxygen is received into the system by the lungs; no great quantity of hydrogen is consumed in any given time for the purposes of life, and consequently the vital heat is much diminished.

Although I have supposed, says Mr. T. that sleep may be induced by pressure and accumulation of lymph in the ventricles of the brain, yet we must remark, that during sleep, the absorbents are certainly at work: 1. In the urinary bladder; for the urine is small in quantity, and high coloured: 2. In the alimentary canal; for the fæces are hardened: 3. In the membrana adiposa; for the fat, after long protracted sleep, is considerably wasted, and at the end of winter, in torpid animals, is commonly consumed: 4. In the ventricles of the brain; for, were it otherwise, not merely sleep, but apoplexy and death, would be the consequence.

Yet we advance but little by all these observations as to the actual cause of sleep; and still less as to the phænomena that accompany it. Writers of the first reputation, both in ancient and modern times, have exhausted themselves upon the subject, yet for the most part they have offered us but little, very little that is satisfactory. The theory of the Greek philosophers, and especially of Epicurus, so beautifully unfolded in Lucretius, lib. iv. 914 and following, is specious rather than convincing; and we are afraid that few who have studied the successive hypotheses of Leibnitz, Wolfe, Locke, Berkeley, Beattie, and Darwin, in modern times, I can say more than this of any of them.

The latest theory that has appeared upon this subject has been offered to the world by Mr. Good in a note appended to his translation of Lucretius, b. iv. v. 926, and on this occasion, as well as on account of what we believe to be its perfectly satisfactory result, we are glad in having an opportunity of presenting it to our readers: the more especially as it undertakes to unfold the very obscure and hitherto perplexing doctrine of dreaming. It is offered to us for the sake of conciseness under the following lemmata:

"I. All the fibrils of the nervous system become fatigued, exhausted, and torpid, in proportion to the length and violence of their exertion, and recover their power alone by rest. The weariness and debility of the muscles of the arms and legs, after extreme exercise, or exercise to which they have not been accustomed, may be adduced as a sufficient proof of this position. The nervous fibrils of the external organs of sense are necessarily subject to the same effect; we neither hear, nor see, nor taste, nor feel, with the same accuracy, after any or all these various organs have been long upon the full stretch of action, with which we do on their first exertion in the morning. Increase or prolongate their action, and their power will be still farther obtunded, till at length, like an over-wearied limb, they become perfectly lethargic, and give no account of whatever is occurring around us; and it is this uniform lethargy, torpidity, or inaction of all the external senses, which we denominate sleep. By the exercise of the will or any other strong stimulus, this sleep, or sensorial torpidity, may be postponed: and vice versa, by the consent of the will, it may be expedited.

"II. The vital organs are far less subject to the influence of stimulants of every kind than the organs of external sense: their actions are hence far more equable and permanent; they are seldom wearied or exhausted, and, of course, seldom sleep or become torpid. From the application of very strong stimulants, however, whether external, as those of severe pain or labour, or internal, as

those of disease or excessive grief, such fatigue or exhaustion actually takes place; and when the exhaustion is complete, they also, like the organs of external sense, sleep or become torpid:—in other words, death ensues, and the spirit separates from the body. The resemblance between death and sleep, therefore, is not less correct, upon the principles of physiology, than it is beautiful among the images of poetry. Sleep is the death or torpidity of the organs of external sense, while the vital functions continue their accustomed actions: death is the sleep or torpidity of the whole.

"III. Every organ of the animal frame recovers from its fatigue or torpidity by rest, provided the principle of life, that is to say, the action of the vital organs, continues. Hence the organs of external sense, in a definite period of time, and a period generally proportioned to the degree of their exhaustion, reacquire their accustomed vigour, are alive to the influence of their appropriate stimulants, and the smallest excitement applied to any one of them, throws the whole once more into action: in other words, the man awakes from sleep, he rouses himself from the temporary death of the organs of external sense. Were it possible for life to continue during a total rest or torpidity of the vital organs, as it does during that of the organs of external sense, there is no doubt that these also would, in time, recover from their exhaustion, and that the man would, in like manner, awake from the total torpidity, the sleep or death of the entire frame: but this is impossible; the soul has now deserted the body: a change in every organ ensues, and the whole system, instead of reviving, becomes a prey to corruption and ruin.

"IV. When the organs of external sense have recruited themselves by repose, the stimulus that rouses the one, rouses, at the same time, the rest, from a habit of association. From the same habit, the torpidity produced by exhaustion, in any single organ, is propagated through every other, and the sleep becomes common to the whole: although it is also unquestionable, that the whole are also fatigued, or partially exhausted, from the fact, that the general stock of sensorial power has been borrowed, in a considerable degree, from the rest, and expended at a single outlet.

"V. The nervous fibrils, or rather tubules of the external organs of sense, are equally affected, and of course become equally exhausted, whether the stimulus be applied at either end; to wit, the end terminating externally, or that connected with the brain; and hence, internal excitements, as those of severe study, intense grief, undue eating and drinking, or febrile diseases, produce the same effect as causes operating from without.

"VI. In either case, the sleep or torpidity produced is sound or healthy, under a certain degree of exhaustion alone: hence mankind sleep most refreshingly after moderate or accustomed fatigue, moderate or accustomed study, moderate or accustomed meals.

"VII. If the stimulus be a little increased beyond this medium, the vital organs themselves become affected, an undue and morbid proportion of sensorial power is secreted, which postpones the torpidity or sleep for the present, but at the expence of the general strength of the whole system, which, in consequence, becomes gradually more exhausted and debilitated: whence a far deeper torpidity, or sleep, must necessarily ensue at length, than would have occurred in the first instance. If such torpidity take place before the vital organs are totally exhausted, it is confined to the external organs of sense alone, which hereby progressively recover their accustomed activity and vigour: if the vital organs be themselves altogether exhausted before the torpidity ensues, it is propagated to themselves, and the consequent sleep is the sleep of death. Violent and long continued labour, as an external stimulus, violent and long continued study, violent and continued fevers, violent and continued grief, a very inordinate debauch, as internal stimuli, are equally liable to produce effects here specified: and the one or the other will take place in proportion to their excess and extremity.

"VIII. If the stimulus affecting the external organs of sense, at which end soever it be applied, be intolerably pungent or forcible, the sensorial power is exhausted immediately, and the organ directly affected becomes instantly torpid. Hence sounds, insufferably loud, make us deaf; excessive light makes us blind; acrimonious smells, or savours, render us incapable of smelling or tasting: and hence, an abrupt shock of joy or grief, a sudden and intense paroxysm of fever, large quantities of wine or spirits, as internal causes, produce coma, palsy, apoplexy, which are only so many modifications of the sleep or torpidity of the nervous tubules of the external organs of sense. If the same abrupt and violent cause be sufficiently powerful to act upon the vital organs as well as those of external sensation, the torpidity becomes universal, and the sleep induced is once more the sleep of death.

"IX. As violent stimulants produce sudden and irrecoverable torpidity, either general or local, according to the mode and place of application, stimulants less violent induce a tendency to the same effect. Hence the nostrils, not accustomed to snuff, are more forcibly agitated by its application than those that are so; the eyes of persons accustomed to sleep in the glare of the sun find no inconvenience from exposure to the light of the morning; while those who always sleep in total darkness are awoke by the return of daylight. And so of the rest.

"X. On this account a very small portion of light, of sound, or of exercise, even the breath of the air alone, are each of them powerful stimulants upon infants, because unaccustomed to them: hence they sleep much, and soundly; so soundly, indeed, that no common stimulus is able, for a long time, to arouse them from their torpidity. In other words, it requires a period of many hours for the external organs to recover from their ex-

haustion. The smallest undulatory motion in the uterus, and the very action of the vital organs themselves, are, perhaps, sufficient to wear out, from time to time, the sensorial power of the fetus on its first formation: and hence the fetus sleeps, with few intermissions, through the whole period of parturition.

"XI. For the same reason, persons in an advanced age are far less impressed by common stimulants than in any former period of their lives: from a long series of exposure to their operation their organs are become more torpid, and hence they require less sleep, and, at the same time, less food. The vital organs, as well as those of external sense, partake of the same disposition. They are, in consequence, less liable to all violent or inflammatory disorders: but the general torpidity increasing, the heart is stimulated with great difficulty—a smaller portion of sensorial power is secreted from the gasses of the atmosphere—a smaller portion of food is thrown into the system from the stomach—the pulse, and every other power, gradually declines, till, at length, if ever man were to die of old age alone, he would die from a total torpidity, or paralysis of the heart. But debilitated or torpified as every organ is become, long before such a period can arrive, the frame at large is incapable of resisting the smallest of those trivial shocks to which man is daily exposed, either internal or external; or, in other words, there is no accumulation of sensorial power to supply the temporary demand, and the man dies from sudden exhaustion rather than from progressive paralysis.

"Upon this theory I might easily and obviously solve a variety of problems which have hitherto eluded all satisfactory explanation. I shall only add to this outline of the theory of sleep a few observations upon that of dreaming, which is so intimately connected with it, as well in nature as in the poem before us.

"I. A certain but a very small degree of stimulus applied, perhaps, to any nerve whatever of the human body, instead of exhausting it seems to afford it pleasure; or, at least, the nerve is able to endure it without becoming torpid, or, which is the same thing, requiring sleep or rest. The orbicular motion of the lips to an infant accustomed to suck, is a source of so much comfort, and attended with so little exhaustion, that, whether sleeping or waking, it will generally be found mimicking the act of sucking, when at a distance from its nurse, and perhaps not thinking of such action itself. A person who, from habit, has acquired a particular motion of any one of his limbs, a twirl of the fingers, or a swinging one leg over the other, perseveres in such motion from habit alone, and feels no torpidity or exhaustion in the nerves that are excited, although it might be intolerably fatiguing to another who has never acquired the same custom.

"II. It is probable that both thought and the action of the vital organs are stimulants of this precise character, if not in their commencement at least very shortly afterwards: that nearly, if not altogether, from the first they are equally pleasing and gentle in their degree of action; and that hence they equally, also, continue without exhausting us, except when unduly roused; and form a habit too pertinacious and invincible to be broken through by any exertions whatever.

Thought is, then, to the brain that which the muscular habits, I have just spoken of, are to the muscles, which are the subjects of them. Both continue alike whether we be reflecting upon the action, or whether we be not: but the habit of thinking is so much older, and, consequently, so much deeper rooted than that of any kind of gesticulation, that, as I have just observed, it is impossible for us to break through it by the utmost efforts of the will: whence it accompanies us, excepting when the brain is totally exhausted, and consequently thrown into a profound torpidity or sleep, not only at all times when awake, but almost at all times during sleep, and is the immediate and necessary cause of our dreaming.

"III. Thought can only be exercised upon objects introduced into the brain, or general sensorium, by the organs of external sensation; and hence the bent or chief direction of our thoughts, whether sleeping or waking, must be derived from those objects which principally impress us, be the causes of such impression what they may. The train of thoughts, then, which recurs from habit alone, as in sleep or total retirement from the world, must generally be of this description; in the former case, however, by no means correctly or perfectly, because there are others, also, which have a tendency to recur, and neither the will nor the senses are in action to repress them; whence proceeds a combination of thoughts or ideas, sometimes in a small degree incongruous, and at other times most wild and heterogeneous; occasionally, indeed, so fearful and extravagant as to stimulate the senses themselves into a sudden renewal of their functions; and, consequently, to break off abruptly the sleep into which they were thrown.

"IV. If the action of the nervous tubules of the brain, thus continued from habit, and producing our dreams, be less powerful during sleep than is sufficient to rouse the senses generally, it may, nevertheless, at times be powerful enough to excite into their accustomed exercise the muscles of those organs or members which are more immediately connected with the train of our dreams, or incoherent thoughts, while, nevertheless, every other organ or member still remains torpid. Hence some persons talk, and others walk in their sleep, without being apprized, on their waking, of any such occurrence.

"V. Whatever be the set of nerves that have chiefly become exhausted from labour or stimulus of the day, the rest, as I have already noticed, partake of the same torpidity from long habit of association; exhausted in some degree, also, themselves by the portion of sen-

torial power which, as from a common stock, they have contributed towards the support of the debilitated organ. But it sometimes happens, either from disease or peculiarity of constitution, that all the external organs of sense do not associate in their actions, or yield alike to the general torpidity of the frame; and that the auditory, the optical, or some other set of nerves, are in vigour, while all the other nerves of the external senses remain torpid; as it may do also, that an entire organ of external sense, like the muscles of an individual member, as observed in the last paragraph, may be awoke or restimulated into action by the peculiar force and bent of the dream, while all the rest continue lethargic.

"VI. If the organ of external sense thus affected be that of hearing, a phænomenon will occur, which is specifically noted by our poet in book V. v. 1182, but which, I believe, has never hitherto been satisfactorily explained; the dreamer must necessarily hear a bye-stander who speaks to him; and if, from the cause specified above, he should happen to have talked in his sleep, so as to give the bye-stander some clue into the train of thoughts of which his dream is composed, a conversation may be maintained, and the bye-stander, by dexterous management, and the assumption of a character which he finds introduced into the dream, be able to draw from the dreamer the profoundest secrets of his bosom: the other senses of the latter, instead of rousing hereby to detect the imposition, being plunged into a still deeper lethargy, from the demand of an increased quantity of sensorial power to support the exhaustion which the wakeful or active organ is in consequence sustaining.

"VII. If the wakeful nerves be the optical alone, the somnambulist, or dreamer, who is accustomed to walk in his sleep, will be able to make his way towards any place to which the course of his dream directs him with the most perfect ease, and without the smallest degree of danger; he will see as clearly, and perhaps more so, as if generally awake; yet, from the very exhaustion, and, of course, increased torpidity of the organs, in consequence of an increased demand of sensorial power from the common stock to support the action of the sense and muscles immediately engaged, every other sense must necessarily be thrown into a deeper sleep or torpidity than on any other occasion. Hence the ears will not be roused even by a sound that might otherwise awake him; he will be insensible, not only to a simple touch, but a severe shaking of his limbs, and may even cough violently without being recalled from his dream. Having accomplished the object of his pursuit, he may safely return, even over the most dangerous precipices, for he sees them distinctly, to his bed; and the optical nerves themselves being now quite exhausted, and the system at large incapable of affording any addition of sensorial power, the torpidity must necessarily be rendered general and profound—so profound, perhaps, as to destroy the habitual action of the nervous tubules of the brain itself, and produce sleep without thought or dreaming.

"VIII. This phænomenon of somnambulism has never, that I know of, to the present day, been satisfactorily or even plausibly accounted for. It follows necessarily, in conjunction with that of speaking and conversing in sleep, from the theory of which I have now, for the first time, presented the outlines; and, I trust, will appear plain and intelligible to the reader."

In the torpid and quiescent state the appetite for food is lost; for it usually bears proportion to the quantity of exertion, whether mental or muscular: and as no fresh supply of hydrogen is received into the stomach, the little required to feed the lambent flame is readily derived by absorption from the cells or reservoirs of fat dispensed over the body, and more especially about the loins.

During our time of sleep, when every muscular fibre is relaxed, and when nutritive particles are distributed wherever they are wanted, provision of oil is made for the consumption of the waking hours. Hence animals who eat and sleep immoderately are apt to be oppressed with fat.

Somnolence, too much indulged, brings on fatuity. Boerhaave relates the case of a physician, who took such delight in sleeping, that he retired to a quiet and sequestered chamber, where, in perfect darkness, he slumbered almost incessantly, till he lost his intellects, and perished in an hospital.

The duration of sleep, with the alternate periods of repose and vigilance, depend much on habit, and this, once acquired, is with difficulty changed.

SLEEP OF PLANTS. Somnus plantarum. The form and appearance which plants put on during the night, very different from what they have in the day; chiefly in the leaves.

SLEEP-WALKING, or SOMNAMBULISM. See the article SLEEP towards its close, sect. vii. and viii.

SLEEP-WINTER. See WINTER SLEEP.

SLEE'PER. *s.* (from *sleep.*) 1. One who sleeps; one who is not awake (*Dryden*). 2. A lazy inactive drone (*Grew*). 3. That which lies dormant, or without effect (*Bacon*). 4. A horizontal piece of timber laid to support a floor.

SLEE'PILY. *ad.* (from *sleepy.*) 1. Drowsily; with desire to sleep. 2. Dully; lazily (*Raleigh*). 3. Stupidly (*Atterbury*).

SLEE'PINESS. *s.* (from *sleepy.*) Drowsiness; disposition to sleep; inability to keep awake (*Arbuthnot*).

SLEE'PLESS. *a.* (from *sleep.*) Wanting sleep; always awake (*Milton*).

SLEE'PY. *a.* (from *sleep.*) 1. Drowsy; disposed to sleep. 2. Not awake (*Dryden*). 3. Soporiferous; somniferous; causing sleep (*Gulliver*).

SLEET. *s.* (perhaps from the Danish, *slet.*) A kind of smooth small hail or snow, not falling in flakes, but single particles (*Dryden*).

To SLEET. *v. n.* (from the noun.) To snow in small particles, intermixed with rain.

SLEE'TY. *a.* (from the noun.) Bringing sleet.

SLEEVE. *s.* (ɾlıꝑ, Saxon.) 1. The part of a garment that covers the arms (*Spenser*). 2. *Sleeve*, in some provinces, signifies a knot or skein of silk. 3. *Sleeve*, Dutch, signifies a cover; any thing spread over (*L'Estrange*).

SLEE'VED. *a.* (from *sleeve.*) Having sleeves.

SLEE'VELESS. *a.* (from *sleeve.*) 1. Wanting sleeves; having no sleeves. 2. Wanting reasonableness; wanting propriety; wanting solidity (*Hall*).

SLEIDAN (John), a German historian, born at Sleiden, 1506. He studied at home, and at Paris and Orleans, and in 1535, was recommended to cardinal du Bellay, who settled a pension on him. He was afterwards engaged in negociations in France and England, and assisted at the council of Trent. He died at Strasburg, 1556. He was strongly attached to the doctrines of Luther. The best of his compositions are, De Statu Religionis et Reipublicæ Commentarii, Carolo Quinto Cæsare, in 25 books, 1555, a well written book, translated into various languages—de quatuor Summis Imperiis Libri tres, a useful work, from which Voltaire drew much information, &c.

SLEIGHT. *s.* (*slag'd*, cunning, Islandic.) Artful trick; cunning artifice; dexterous practice (*Swift*).

SLE'NDER. *a.* (*slinder*, Dutch.) 1. Thin; small in circumference compared with the length; not thick (*Milton*). 2. Small in the waist; having a fine shape (*Dryden*). 3. Not bulky; slight; not strong (*Pope*). 4. Small, inconsiderable; weak (*Tillotson*). 5. Sparing; less than enough (*Shakspeare*). 6. Not amply supplied (*Philips*).

SLE'NDERLY. *ad.* (from *slender.*) 1. Without bulk. 2. Slightly; meanly (*Hayward*).

SLE'NDERNESS. *s.* (from *slender.*) 1. Thinness; smallness of circumference (*Newton*). 2. Want of bulk or strength (*Arbuthnot*). 3. Slightness; weakness; inconsiderableness (*Whitgift*). 4. Want of plenty.

SLEPT. The preterit of *sleep.*

SLESWICK, or NORTH JUTLAND, a duchy of Denmark, separated from Holstein by the river Eyder. It is 100 miles long and 60 broad, and a fertile and populous country.

SLESWICK, an ancient and considerable town of Denmark, capital of a duchy of the same name. It is an irregular town of great length. The houses are of brick, and, like all the other towns in this country, resemble those of Holland. The inhabitants dress also like the Dutch; and many of them speak their tongue, though the usual languages are the German and Danish. Near to Sleswick is the old ducal palace: (see GOTTORP.) Sleswick is situate near the bottom of an arm of the Baltic, called the Sley, 60 miles N.W. of Lubec, and 125 S.W. of Copenhagen. Lon. 10. 0 E. Lat. 54. 39 N.

SLEW. The preterit of *slay.*

To SLEY. *v. n.* To part or twist into threads (*Shakspeare*).

To SLICE. *v. n.* (ɾlıꝛan, Saxon.) 1. To cut into flat pieces (*Sandys*). 2. To cut into parts (*Cleaveland*). 3. To cut off in a broad piece (*Gay*). 4. To cut; to divide (*Burnet*).

SLICE. *s.* (ɾlıꝛe, Saxon.) 1. A broad piece cut off (*Swift*). 2. A broad piece (*Pope*). 3. A broad head fixed in a handle; a peel; a spatula (*Hakewill*).

SLICK. *a.* (*slickt*, Dutch.) See SLEEK (*Brown*).

SLID. The preterit of *slide.*

SLI'DDEN. The participle passive of *slide.*

To SLI'DDER. *v. n.* (*slidderen*, Dutch.) To slide with interruption (*Dryden*).

To SLIDE. *v. n.* preterit *slid*; participle pass. *slidden* (ɾlıꝺan, ɾlıꝺeneꝛe, Saxon.) 1. To pass along smoothly; to slip; to glide (*Bacon*). 2. To move without change of the foot (*Milt.*). 3. To pass inadvertently (*Ecclus.*). 4. To pass unnoticed (*Sidney*). 5. To pass along by silent and unobserved progression (*Shakspeare*). 6. To pass silently and gradually from good to bad (*South*). 7. To pass without difficulty or obstruction (*Pope*). 8. To move upon the ice by a single impulse, without change of feet (*Waller*). 9. To fall by error (*Bacon*). 10. To be not firm (*Thomson*). 11. To pass with a free and gentle course or flow.

To SLIDE. *v. a.* To pass imperceptibly (*Watts*).

SLIDE. *s.* (from the verb.) 1. Smooth and easy passage (*Bacon*). 2. Flow; even course (*Bacon*).

SLI'DER. *s.* (from *slide.*) 1. He who slides. 2. That which slides.

SLIDING RULE, a mathematical instrument serving to perform computations in gauging, measuring &c. without the use of compasses; merely by the sliding of the parts of the instrument one by another, the lines and divisions of which give the answer or amount by inspection.

This instrument is variously contrived and applied by different authors, particularly Gunter, Partridge, Hunt, Leadbetter, Symons, Everard, and Coggeshall; but the most usual and useful ones are those of the two latter.

Everard's Sliding Rule is chiefly used in cask gauging. It is commonly made of box, 12 inches long, 1 inch broad, and $\frac{5}{16}$ of an inch thick. It consists of three parts; viz. the stock just mentioned, and two thin slips of the same length, sliding in small grooves in two opposite sides of the stock: consequently, when both these pieces are drawn out to their full extent the instrument is 3 feet long.

On the first broad face of the instrument are four logarithmic lines of numbers; for the properties, &c. of which, see GUNTER'S LINE. The first, marked A, consisting of two radii numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 1; and then 2, 3, 4, 5, &c. to 10. On this line are four brass centre-pins, two in each radius; one in each of them being marked MB, for malt-bushel, is set at 2150·42 the number of

cubic inches in a malt-bushel; the other two are marked with A, for ale-gallon, at 282, the number of cubic inches in an ale gallon. The 2d and 3d lines of numbers are on the sliding pieces, and are exactly the same with the first; but they are distinguished by the letter B. In the first radius is a dot, marked *Si*, at ·707, the side of a square inscribed in a circle whose diameter is 1. Another dot, marked *Se*, stands at ·886, the side of a square equal to the area of the same circle. A third dot, marked W, is at 231, the cubic inches in a wine gallon. And a fourth, marked C, at 3·14, the circumference of the same circle, whose diameter is 1. The fourth line of numbers, marked MD, to signify malt-depth, is a broken line of two radii, numbered 2, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 9, 8, 7, &c.; the number 1 being set directly against MB on the first radius.

On the second broad face, marked *cd*, are several lines: as 1st, a line marked D, and numbered 1, 2, 3, &c. to 10. On this line are four centre pins: the first, marked WG, for wine-gauge, is at 17·15, the gauge-point for wine gallons, being the diameter of a cylinder whose height is one inch, and content 231 cubic inches, or a wine gallon: the second centre-pin, marked AG, for ale-gauge, is at 18·95, the like diameter for an ale gallon: the 3d, marked MS, for malt square, is at 46·3, the square root of 2150·42, or the side of a square whose content is equal to the number of inches in a solid bushel: and the fourth, marked MR, for malt-round, is at 52·32, the diameter of a cylinder, or bushel, the area of whose base is the same 2150·42, the inches in a bushel. 2dly, Two lines of numbers on the sliding piece, on the other side, marked C. On these are two dots; the one, marked *c*, at ·0795, the area of a circle whose circumference is 1; and the other, marked *d*, at ·785, the area of the circle whose diameter is 1. 3dly, Two lines of segments, each numbered 1, 2, 3, to 100; the first for finding the ullage of a cask, taken as the middle frustrum of a spheroid, lying with its axis parallel to the horizon; and the other for finding the ullage of a cask standing.

Again, on one of the narrow sides, noted *c*, are, 1st, a line of inches, numbered 1, 2, 3, &c. to 12, each subdivided into 10 equal parts. 2dly, A line by which, with that of inches, we find a mean diameter for a cask, in the figure of the middle frustrum of a spheroid: it is marked *spheroid*, and numbered 1, 2, 3, &c. to 7. 3dly, A line for finding the mean diameter of a cask, in the form of the middle frustrum of a parabolic spindle, which gaugers call the second variety of casks; it is therefore marked second variety, and is numbered 1, 2, 3, &c.

4thly, A line by which is found the mean diameter of a cask of the third variety, consisting of the frustrums of two parabolic conoids, abutting on a common base; it is therefore marked *third variety*, and is numbered 1, 2, 3, &c.

On the narrow face, marked *f*, are, 1st, a line of a foot divided into 100 equal parts, marked FM. 2dly, A line of inches, like that before mentioned, marked IM. 3dly, A line for finding the mean diameter of the fourth variety of casks, which is formed of the frustrums of two cones, abutting on a common base. It is numbered 1, 2, 3, &c.; and marked FC, for frustrum of a cone.

On the backside of the two sliding pieces is a line of inches, from 12 to 36, for the whole extent of the 3 feet, when the pieces are put endwise; and against that, the correspondent gallons and 100th parts, that any small tub, or the like open vessel, will contain at 1 inch deep.

For the various uses of this instrument, see the authors mentioned above, and most other writers on gauging.

Coggeshall's Sliding Rule is chiefly used in measuring the superficies and solidity of timber, masonry, brick-work, &c.

This consists of two rulers, each a foot long, which are united together in various ways. Sometimes they are made to slide by one another, like glaziers' rules: sometimes a groove is made in the side of a common two-foot joint rule, and a thin sliding piece in one side, and Coggeshall's lines added on that side; thus forming the common or carpenter's rule: and sometimes one of the two rulers is made to slide in a groove made in the side of the other.

There are several other varieties in the construction of the sliding rule; but they need not be described here.

SLIGHT. *a.* (*slicht*, Dutch.) 1. Small; worthless; inconsiderable (*Dryden*). 2. Not important; not cogent; weak (*Locke*). 3. Negligent; not vehement; not done with effort (*Milton*). 4. Foolish; weak of mind (*Hudibras*). 5. Not strong; thin; as, *a* slight *silk*.

SLIGHT. *s.* (from the adj.) 1. Neglect; contempt; act of scorn (*Clarissa*). 2. Artifice; cunning practice: more properly *sleight* (*Arbuthnot*).

To SLIGHT. *v. a.* (from the adjective.) 1. To neglect; to disregard (*Locke*). 2. To throw carelessly (*Shakspeare*). 3. To overthrow; to demolish (*Junius*). 4. *To* SLIGHT *over*. To treat or perform carelessly (*Bacon*).

SLI'GHTER. *s.* (from *slight*.) One who disregards.

SLI'GHTINGLY. *ad.* (from *slighting*.) Without reverence; with contempt (*Boyle*).

SLI'GHTLY. *ad.* (from *slight*.) 1. Negligently; without regard (*Hooker*). 2. Scornfully; contemptuously (*Philips*). 3. Weakly; without force (*Milton*). 4. Without worth.

SLI'GHTNESS. *s.* (from *slight*.) 1. Weakness; want of strength. 2. Negligence; want of attention (*Dryden*).

SLIGO, a county of Ireland, in the province of Connaught, 25 miles long and nearly as much broad; bounded on the E. by Leitrim, on the S.E. by Roscommon, on the S.W. and W. by Mayo, and on the N. by the Atlantic. It contains 41 parishes, and sends four members to parliament.

SLIGO, a borough of Ireland, in a county

of the same name, and the only market town in it. It is seated on the bay of Sligo, 26 miles E. of Killala, and 100 N.W. of Dublin. Lon. 8. 26 W. Lat. 54. 13 N.

SLI'LY. *ad.* (from *sly*.) Cunningly; with cunning secrecy (*Dryden*).

SLIM. *ad.* Slender; thin of shape (*Add.*).

SLIME. *s.* (rlam, Saxon; *sligm*, Dutch.) Viscous mire; any glutinous substance (*Ral.*).

SLI'MINESS. *s.* (from *slimy*.) Viscosity; glutinous matter (*Floyer*).

SLI'MY. *a.* (from *slime*.) 1. Overspread with slime (*Shakspeare*). 2. Viscous; glutinous (*Milton*).

SLI'NESS. *s.* (from *sly*.) Designing artifice (*Addison*).

SLING. *s.* (rlingan, Sax.; *slingen*, Dutch.) 1. A missive weapon made by a strap and two strings; the stone is lodged in the strap, and thrown by loosing one of the strings (*Job*). 2. A throw; a stroke (*Milton*). 3. A kind of hanging bandage, in which a wounded limb is sustained.

To SLING. *v. a.* (from the noun.) 1. To throw by a sling. 2. To throw; to cast (*Addison*). 3. To hang loosely by a string (*Dryden*). 4. To move by means of a rope (*Dryden*).

SLI'NGER. *s.* (from *sling*.) One who slings or uses the sling (*Kings*).

SLINGING is used variously at sea; but chiefly for hoisting casks or other heavy things with slings, *i. e.* contrivances of ropes spliced into themselves at either end, with one eye big enough to receive the cask or whatever is to be slung. There are other slings, which are made longer, and with a small eye at each end; one of which is put over the breech of a piece of ordnance, and the other eye comes over the end of an iron crow, which is put into the mouth of the piece, to weigh and hoist the gun as they please. There are also slings by which the yards are bound fast to the cross-tree aloft, and to the head of the mast, with a strong rope or chain, that if the tie should happen to break, or to be shot to pieces in fight, the yard, nevertheless, may not fall upon the hatches.

SLINGING A MAN OVERBOARD, in order to stop a leak in a ship, is done thus: the man is trussed up about the middle in a piece of canvas, and a rope to keep him from sinking, with his arms at liberty, a mallet in one hand, and a plug, wrapped in oakum and well tarred in a tarpawling clout, in the other, which he is to beat with all dispatch into the hole or leak.

To SLINK. *v. a.* preterit *slunk*. (rlingan, Saxon; to creep.) To sneak; to steal out of the way (*Milton*).

To SLINK. *v. n.* To cast; to miscarry of. A low word (*Mortimer*).

To SLIP. *v. n.* (rlipan, Saxon; *slippen*, Dutch.) 1. To slide; not to tread firm (*South*). 2. To slide; to glide (*Sidney*). 3. To move or fly out of place (*Wiseman*). 4. To sneak; to slink (*Spenser*). 5. To glide; to pass unexpectedly or imperceptibly (*Sidney*). 6. To fall into fault or error (*Ecclus.*). 7. To creep by oversight (*Pope*). 8. To escape; to fall away out of the memory (*Hooker*).

To SLIP. *v. a.* 1. To convey secretly (*Arbuthnot*). 2 To lose by negligence (*B. Jon.*). 3. To part twigs from the main body by laceration (*Mortimer*). 4. To escape from; to leave slily (*Shakspeare*). 5. To let loose (*Dryden*). 6. To let a dog loose (*Dryden*). 7. To throw off any thing that holds one (*Swift*). 8. To pass over negligently (*Atterbury*).

SLIP. *s.* (from the verb.) 1. The act of slipping; false step. 2. Error; mistake; fault (*Wotton*). 3. A twig torn from the main stock (*Ray*). 4. A leash or string in which a dog is held (*Bramhall*). 5. An escape; a desertion (*Hudibras*). 6. A long narrow piece (*Addison*).

SLI'PBOARD. *s.* (*slip* and *board*.) A board sliding in grooves (*Gulliver*).

SLI'PKNOT. *s.* (*slip* and *knot*.) A bow-knot; a knot easily untied (*Moxon*).

SLI'PPER or SLI'PSHOE. *s.* (from *slip*.) A shoe without leather behind, into which the foot slips easily (*Raleigh*).

SLIPPER (Lady's), in botany. See CYPRIPEDIUM.

SLIPPER WORT. See CALCEOLARIA.

SLI'PPERILY. *ad.* (from *slippery*.) In a slippery manner.

SLI'PPERINESS. *s.* (from *slippery*.) 1. State or quality of being slippery; smoothness; glibness (*Sharp*). 2. Uncertainty; want of firm footing.

SLI'PPERY. *a.* (rlipur, Saxon; *sliperig*, Swedish.) 1. Smooth; glib (*Arbuthnot*). 2. Not affording firm footing (*Cowley*). 3. Hard to hold; hard to keep (*Dryden*). 4. Not standing firm (*Shakspeare*). 5. Uncertain; changeable; mutable; instable (*Shakspeare*). 6. Not certain in its effects (*L'Estrange*). 7. Not chaste (*Shakspeare*).

SLI'PPY. *a.* (from *slip*.) Slippery; easily sliding. A barbarous word (*Floyer*).

SLI'PSHOD. *a.* (*slip* and *shod*.) Having the shoes not pulled up at the heels, but barely slipped on (*Swift*).

SLI'PSLOP. *s.* Bad liquor. A low word formed by reduplication of *slop*.

SLISHSLASH. *s.* A low word formed by reduplicating *slash* (*Shakspeare*).

To SLIT. *v. a.* pret. and part. *slit* and *slitted*. (rlitan, Saxon.) To cut longwise (*Brown*).

SLIT. *s.* (rlit, Saxon.) A long cut, or narrow opening (*Newton*).

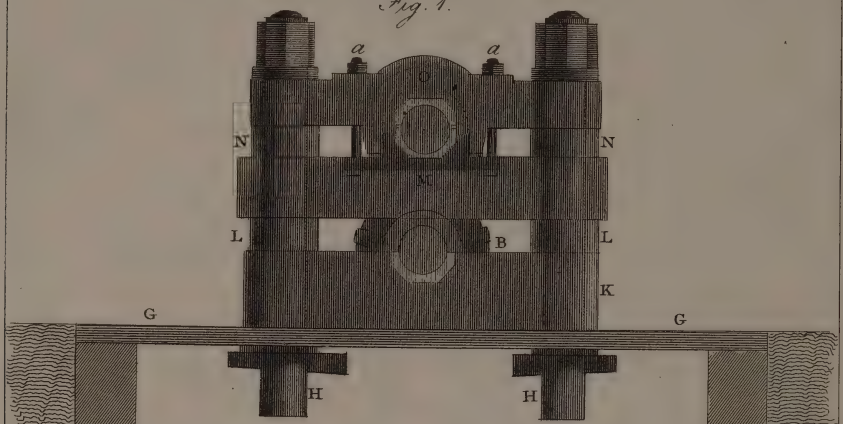
SLITTING MILL is a machine used in the manufacture of iron for dividing and separating a bar of iron into several smaller rods: it usually accompanies the rolling machine by which the iron is flattened out to a proper thickness; and then by passing it through the slitting rollers, it is cut or slit up into square or rectangular rods for making hoops, bolts, &c.

A slitting machine is represented in plate 161, which contains three figures of it. The two first are elevations at right angles to each other; and fig. 3 is a section of the machine.

SLITTING MILL.

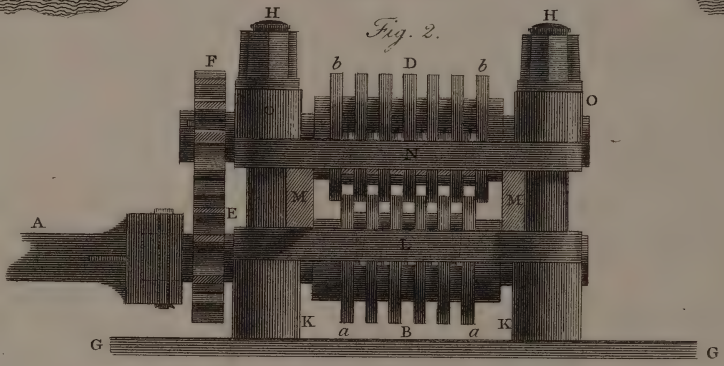
Elevation.

Fig. 1.



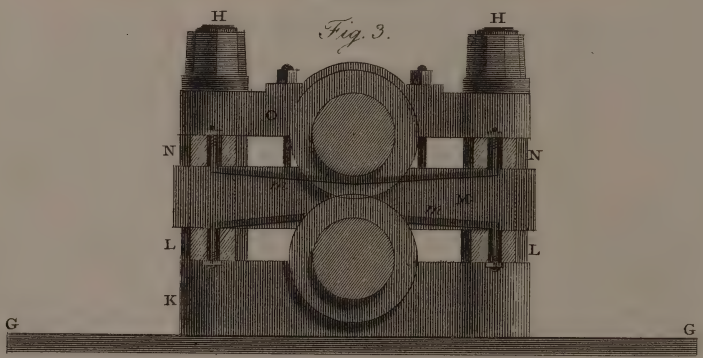
Front View.

Fig. 2.



Section.

Fig. 3.



J. Farey, Junr. del.r

Mutlow. Sc. Bufsell Col

London, Published by Sherwood & Co.r Paternoster Row, Oct.r 1, 1812.

A, fig. 2, represents a cast iron shaft, which conveys the power to turn the rollers BD, from a water-mill, steam-engine, &c.; the lower one, B, by being attached to its pivot and the upper roller D, by means of two equal cog wheels EF, fastened on the pivots of the rollers, and causing them to turn together in contrary directions. Both rollers have a number of rings, *aa*, *bb*, projecting from their surfaces: these rings are turned extremely true in the lathe, and the thickness of each ring is just equal to the space between it and the next; so that when the rollers are put together, as in fig. 2, the rings *bb* of the upper roller, fit in between the rings *aa* of the lower roller. The rollers are mounted in an iron frame composed of several pieces. The first is a large iron plate GG, firmly bolted down to cross beams laid on the ground; it is perforated with four holes to receive four iron bolts HH, which hold together all the frame. They are kept down to the plate by cross wedges put through them beneath it. KK are two pieces of iron through which the bolts pass, containing the brass bearings for the pivots of the lower roller: LL are two pieces to connect the bolts: M two wedges, to keep the two rollers the proper distance asunder: N connecting pieces similar to L and O are cross pieces, to receive the bearing of the upper roller. All these parts are firmly held together by a nut on the top of each bolt, H. The rollers are made of cast iron (though they would be better of wrought iron, and the rings of steel), and the pivots turned at the same time with the rings, that they may have one common axis. The bearings or sockets in which they turn are made of brass, and let into the cast iron pieces L and O of the frame. The upper roller has two of these brasses; the upper one to sustain the pressure of the roller when in use, and the other to support the weight of the roller. The two brasses are connected by bolts *aa*, which can be drawn up till the brasses embrace the gudgeons that they have no shake.

The connecting pieces, L and N, of the frame have a small slit through them (as is seen in the section fig. 3), to receive the ends of crooked iron bars *m*, which pass across the frame so as to go into the notch or space between the rings of each roller (as is shewn in the front view, fig. 2). The bars are bent at their ends, and, passing through the connecting pieces L N, are secured there by a nut.

The iron which is to be subjected to this machine we will suppose to be first brought to a flat, straight bar, by means of the rolling or flatting mill; suppose 1 inch thick, 4 broad, and 6 or 7 feet long, and by means of the slitting mill it is to be cut into 4 rods of 1 inch square; the rings on the roller must then be 1 inch broad. A furnace is placed as close as is convenient to the machine, in which a number of the bars are heated till they acquire a white heat. The mill which turns the rollers is then put in motion; the door of the furnace is opened; a workman takes a bar in a pair of pincers, and places one end of the bar between the guide bars *m*; the motion of the rollers draws the bar in between them, and by this means the ring of one roller presses a corresponding breadth of the hot metal into the space between the rings of the other roller: this being performed by both rollers, completely divides the bar into several rods, the same breadth with the rings of the rollers. A small leaden pipe is fixed over the rollers, and being perforated with holes, constantly lets fall a supply of cold water on the rollers to prevent their becoming hot, and thus losing their hardness, which alone preserves their circular figure, under the intense pressure they have to sustain in dividing the iron. The guide bars *m* are intended to force the iron rods, when cut out of the grooves, between the rings of the rollers, which they would not otherwise quit after being so forcibly pressed into them by the rings of the opposite roller.

To SLIVE. *To* SLI'VER. *v. a.* (slipan, Saxon.) To split; to divide longwise; to tear off longwise (*Shakspeare*).

SLI'VER. *s.* (from the verb.) A branch torn off (*Shakspeare*).

SLOANE (Sir Hans, bart.), an eminent physician and naturalist, was born at Killileagh, in the north of Ireland, in 1660. He chose physic for his profession; and, in order to attain a perfect knowledge of the several branches of it repaired to London. Here he attended all the public lectures of anatomy, botany, and chemistry. Having spent four years in London he went to Paris, and there attended the hospitals, heard the lectures of Tournefort the botanist, of Du Verney the anatomist, and other eminent masters. Having obtained letters of recommendation from Tournefort, he went to Montpelier. He spent a whole year in collecting plants in this place, and travelled through Languedoc with the same view. In 1684 he returned to London, with an intent to settle and follow his profession. During which time he was chosen a fellow of the Royal Society, and of the College of Physicians. But a prospect of making new discoveries in natural productions induced him to take a voyage to Jamaica, in quality of physician to Christopher, duke of Albemarle, then governor of that island. His whole stay at Jamaica was scarce 15 months, in which time he collected a variety of plants. He now applied himself closely to his profession, and became so eminent, that he was chosen physician to Christ's Hospital on the first vacancy. He was chosen secretary to the Royal Society in 1693, and immediately revived the publication of the Philosophical Transactions, which had been omitted for some time: he continued to be editor of them till 1712; and the volumes which were published in this period contain many pieces written by himself. He was created a baronet by George I. chosen a foreign member of the Royal Academy at Paris, president of the College of Physicians, and president of the Royal Society on the death of sir Isaac Newton. Having faithfully discharged the respective duties of the places he enjoyed, and

answered the high opinion which the public had conceived of him, he retired, at the age of eighty, to Chelsea, to enjoy in a peaceful tranquillity the remains of a well-spent life. He died Jan. 11, 1752. He published the History of Jamaica, in 2 vols. folio, an elaborate work, still in high estimation.

SLOANEA. In botany, a genus of the class polyandria, order monogynia. Calyx one-leafed, from five to nine-cleft; corolless; anthers attached to the filaments beneath the tip; capsule bristly, from three to six-celled, from three to six-valved; seeds two, with a berried coat. Three species, natives of South America and the West Indies.

SLOATS. *s.* Of a cart, are those underpieces which keep the bottom together (*Bailey*).

SLO'BBER. *s.* (*glavoerio*, Welsh.) Slaver.

To SLOCK. *v. n.* (*slock*, to quench, Swedish and Scottish.) To slake; to quench.

SLOE, the fruit of the black thorn or wild plum. See PRUNUS.

SLONIM, a town of Lithuania, in the palatinate of Novogrodeck, with a castle, seated on the Sezraa, 40 miles S.W. of Novogrodeck, and 60 S.E. of Grodno. Lon. 23. 57 E. Lat. 53. 0 N.

SLOOP, in naval affairs, a small vessel, furnished with one mast, the main sail of which is attached to a gaff above, to the mast on its foremost edge, and to a boom below; it differs from a cutter by having a fixed steering bowsprit and a jib-stay: the sails also are less in proportion to the size of the vessel. Sloops of war are vessels commanded by officers in a middle rank between a lieutenant and a post captain: these are styled masters and commanders. They carry from ten to eighteen guns, and are variously rigged as ships, brigs, schooners, and sometimes cutters.

To SLOP. *v. a.* (from *lap*, *lop*, *slop*.) To drink grossly and greedily.

SLOP. *s.* (from the verb.) Mean and vile liquor of any kind (*Dryden*).

SLOP. *s.* (rlop, Saxon; *sloove*, Dutch, a covering.) Trowsers; open breeches (*Shaks.*).

SLOPE. *a.* Oblique; not perpendicular.

SLOPE. *s.* (from the adjective.) 1. An oblique direction; any thing obliquely directed. 2. Declivity; ground cut or formed with declivity (*Pope*).

SLOPE. *ad.* Obliquely; not perpendicularly (*Milton*).

To SLOPE. *v. a.* (from the adjective.) To form to obliquity or declivity; to direct obliquely (*Pope*).

To SLOPE. *v. n.* To take an oblique or declivous direction (*Dryden*).

SLO'PENESS. *s.* (from *slope*.) Obliquity; declivity; not perpendicularly (*Wotton*).

SLO'PEWISE. *a.* (*slope* and *wise*.) Obliquely; not perpendicularly (*Carew*).

SLO'PINGLY. *ad.* (from *sloping*.) Obliquely; not perpendicularly (*Digby*).

SLO'PPY. *a.* (from *slop*.) Miry and wet.

To SLOT. *v. a.* (*slughen*, Dutch.) To strike or clash hard.

SLOT. *s.* (*slod*, Islandic.) The track of a deer.

SLOTH. *s.* (rlæþ, rleþ, Saxon.) 1. Slowness; tardiness (*Shakspeare*). 2. Laziness; sluggishness; idleness (*Milton*).

SLOTH, in mastiology. See BRADYPUS.

SLO'THFUL. *a.* (*sloth* and *full*.) Idle; lazy; sluggish; inactive; indolent; dull of motion (*Proverbs*).

SLO'THFULLY. *ad.* With sloth.

SLO'THFULNESS. *s.* Idleness; laziness; sluggishness; inactivity (*Hooker*).

SLOUCH. *s.* (*sloff*, Danish, stupid.) 1. A downcast look; a depression of the head (*Swift*). 2. A man who looks heavy and clownish (*Gay*).

To SLOUCH. *v. n.* (from the noun.) To have a downcast clownish look.

SLO'VEN. *s.* (*sloef*, Dutch; *yslyven*, Welsh.) A man indecently negligent of cleanliness; a man dirtily dressed (*Herbert*).

SLO'VENLINESS. *s.* (from *slovenly*.) Indecent negligence of dress; neglect of cleanliness (*Wotton*).

SLO'VENLY. *a.* (from *sloven*.) Negligent of dress; negligent of neatness; not neat; not cleanly (*L'Estrange*).

SLO'VENLY. *ad.* (from *sloven*.) In a coarse inelegant manner (*Pope*).

SLO'VENRY. *s.* (from *sloven*.) Dirtiness; want of neatness (*Shakspeare*).

SLOUGH. *s.* (rloȝ, Saxon.) 1. A deep miry place; a hole full of dirt (*Hayward*). 2. The skin which a serpent casts off at his periodical renovation (*Grew*). 3. The part that separates from a foul sore (*Wiseman*).

SLO'UGHY. *a.* (from *slough*.) Miry; boggy; muddy (*Swift*).

SLOW. *a.* (rlap, rleap, Saxon; *sleeuw*, Frisic.) 1. Not swift; not quick of motion; not speedy; not having velocity; wanting celerity (*Locke*). 2. Late; not happening in a short time (*Milton*). 3. Not ready; not prompt; not quick (*Addison*). 4. Dull; inactive; tardy; sluggish (*Dryden*). 5. Not hasty; acting with deliberation; not vehement (*Common Prayer*). 6. Dull; heavy in wit (*Pope*).

SLOW, in composition, is an adverb; *slowly*: as, *slow*-paced.

To SLOW. *v. a.* (from the adjective.) To omit by dilatoriness; to delay; to procrastinate: not in use (*Shakspeare*).

SLO'WLY. *ad.* (from *slow*.) 1. Not speedily; not with celerity; not with velocity (*Pope*). 2. Not soon; not early; not in a little time (*Dryden*). 3. Not hastily; not rashly. 4. Not promptly; not readily. 5. Tardily; sluggishly (*Addison*).

SLO'WNESS. *s.* (from *slow*.) 1. Smallness of motion; not speed; want of velocity; absence of celerity or swiftness (*Watts*). 2. Length of time in which any thing acts or is brought to pass; not quickness (*Hooker*). 3. Dulness to admit conviction or affection (*Bentley*). 4. Want of promptness; want of readiness. 5. Deliberation; cool delay. 6. Dilatoriness; procrastination.

SLO'WWORM. *s.* (ꝛlapýnm, Saxon.) The blindworm; a large viper, not mortal, scarcely venomous (*Brown*).

To SLU'BBER. *v. a.* (probably from *lubber.*) 1. To do any thing lazily, imperfectly, or with idle hurry (*Sidney*). 2. To stain; to daub (*Shakspeare*). 3. To cover coarsely or carelesly (*Wotton*).

SLU'BBERDEGULLION. *s.* A paltry, dirty, sorry wretch (*Hudibras*).

SLUCZK, a large and populous town in Poland, in Lithuania, and capital of a duchy of the same name; famous for three battles gained here by Constantine duke of Ostrog over the Tartars, in the reign of Sigismund I. It is seated on the river Sluczk, 72 miles S.E. of Minski, and 70 S. of Novogrodeck. Lon. 27. 44 E. Lat. 53. 2 N.

SLUDGE. *s.* Mire; dirt mixed with water (*Mortimer*).

SLUG. *s.* (*slung*, Danish, and *slock*, Dutch, signify a glutton.) 1. An idler; a drone; a slow, heavy, sleepy, lazy wretch (*Shaksp.*). 2. A hinderance; an obstruction (*Bacon*). 3. A kind of slow creeping snail. (See LIMAX.) 4. (ꝛlecz, a hammerhead, Saxon.) A cylindrical or oval piece of metal shot from a gun (*Pope*).

To SLUG. *v. n.* (from the noun.) To lie idle; to play the drone; to move slowly (*Spenser*).

SLU'GGARD. *s.* (from *slug.*) An idler; a drone; an inactive lazy fellow (*Dryden*).

To SLU'GGARDIZE. *v. a.* (from *sluggard.*) To make idle; to make dronish (*Shakspeare*).

SLU'GGISH. *a.* (from *slug.*) Dull; drowsy; lazy; slothful; idle; slow (*Waller*).

SLU'GGISHLY. *ad.* Dully; not nimbly; lazily; idly; slowly.

SLU'GGISHNESS. *s.* Dulness; sloth; laziness; idleness; inertness (*Locke*).

SLUICE. *s.* (*sluyse*, Dutch; *escluse*, Fr.; *sclusa*, Italian.) A watergate; a floodgate; a vent for water (*Milton*).

To SLUICE. *v. a.* (from the noun.) To emit by floodgates (*Milton*).

SLUICE, in hydraulics, a frame of timber, stone, earth, &c. serving to retain and raise the water of the sea, a river, canal, &c. and on occasion to let it pass: such is the sluice of a mill, which stops and collects the water of a rivulet, &c. in order to discharge it at length, in greater plenty, upon the mill-wheel: such also are those used in drains, to discharge water off lands; and such are the sluices of Flanders, &c. which serve to prevent the waters of the sea overflowing the lower lands, except when there is occasion to drown them. Sometimes there is a canal between two gates or sluices, in artificial navigation, to save the water, and render the passage of boats equally easy and safe, upwards and downwards; as in the sluices of Briare, in France, which are a kind of massive walls, built parallel to each other at the distance of twenty or twenty-four feet, closed with strong gates at each end, between which is a kind of canal or chamber, considerably longer than broad, wherein a vessel being inclosed, the water is let out at the first gate, by which the vessel is raised fifteen or sixteen feet, and passed out of this canal into another much higher. By such means a boat is conveyed out of the Loire into the Seine, though the ground between them rise above 150 feet higher than either of those rivers.

The construction of sluices ought to be conducted by an able engineer, who is well acquainted with the action of fluids in general, and particularly with the situation of the place, the nature of the soil, &c. where the sluice is to be erected; if on the sea-shore, he ought to be perfectly well acquainted with the effects of the sea on that coast, and the seasons when it is calm or stormy, that he may be able to prevent the fatal accidents thence arising: and, if in a river, it is necessary to know whether it usually overflows its banks, and at what seasons of the year its waters are highest and lowest. The machines for driving the piles should be placed about forty yards from the side of the sluice, above and below it. As to the depth of sluices, it must be regulated by the uses for which they are designed; thus, if a sluice is to be erected at the entrance of a basin for shipping, its depth must correspond with the draught of water of the largest ship that may at any time have occasion to enter thereby. The rule usually observed is to make the surface of the bottom of the canal on a level with the low water-mark: but if the bottom of the harbour and canal be such as to be capable of becoming deeper by the action of the water, Belidor very justly observes, that the bottom of the sluice-work should be made deeper than either.

When a sluice is to be placed at the bottom of a harbour, in order to wash away the filth that may gather in it, by means of the waters of a river or canal; in this case the bottom of the sluice-work should be two feet or eighteen inches higher than the bottom of the harbour, that the water may run with the greater violence.

An engineer ought always to have in his view, that the faults committed in the construction of sluices are almost always irreparable. We shall therefore lay down some rules, from Belidor, for avoiding any oversights of this kind: 1. In order to adjust the level of the sluice-work with the utmost exactness, the engineer ought to determine how much deeper it must be than a fixed point; and this he should mark down in his draught, in the most precise terms possible. 2. When the proper depth is settled, the foundation is next to be examined; and here the engineer cannot be too cautious, lest the apparent goodness of the soil deceive him; if the foundation is judged bad, or insufficient to bear the superstructure, it must be secured by driving piles, or a grate-work of carpentry. 3. There should be engines enow provided for draining the water; and these should be entirely under the direction of the engineer, who is to take care that they are so placed as not to be an obstacle

to the work; and also cause proper trenches to be cut, to convey the water clear off from the foundation. 4. When the sluice is to be built in a place where the workmen will be unavoidably incommoded by the waters of the sea, &c. all the stones for the mason-work, as well as the timbers for that of carpentry, should be prepared beforehand; so that when a proper season offers for beginning the work, there remains nothing to be done but to fix every thing in its place.

Sluices are made different ways, according to the uses they are intended for: when they serve for navigation, they are shut with two gates, presenting an angle towards the stream; but when made near the sea, there are two pair of gates, one to keep the water out, and the other to keep it in, as occasion requires: the pair of gates next the sea present an angle that way, and the other pair the contrary way; the space inclosed by these gates is called a chamber. When sluices are designed to detain the water in some parts of the ditch of a fortress, they are made with shutters to slide up and down in grooves; and when they are made to cause an inundation, they are then shut by means of square timbers let down into cullises, so as to lie close and firm. Particular care must be taken, in the building of a sluice, to lay the foundation in the securest manner possible; to lay the timber-grates and floors in such a manner that the water cannot penetrate through any part, otherwise it will undermine the work; and, lastly, to make the grates of a proper strength, in order to support the pressure of the water, and yet to use no more timber than is necessary. See CANAL.

SLU'ICY. *a.* (from *sluice.*) Falling in streams, as from a sluice or floodgate (*Dryden*).

To SLU'MBER. *v. n.* (ꝛlumeꝛan, Saxon; *sluymeren*, Dutch.) 1. To sleep lightly; to be not awake, nor in profound sleep (*Milton*). 2. To sleep; to repose: *sleep* and *slumber* are often confounded (*Job*). 3. To be in a state of negligence and supineness (*Young*).

To SLU'MBER. *v. a.* 1. To lay to sleep. 2. To stupify; to stun (*Spenser*).

SLU'MBER. *s.* (from the verb.) 1. Light sleep; sleep not profound (*Pope*). 2. Sleep; repose (*Dryden*).

SLU'MBEROUS. SLU'MBERY. *a.* (from *slumber.*) 1. Inviting to sleep; soporiferous; causing sleep (*Pope*). 2. Sleepy; not waking (*Shakspeare*).

SLUNG. The pret. and part. pass. of *sling.*

SLUNK. The pret. and part. pass. of *slink.*

To SLUR. *v. a.* (*slooring*, Dutch, nasty; *sloore*, a slut.) 1. To sully; to soil; to contaminate. 2. To pass lightly; to balk; to miss (*Dryden*). 3. To cheat; to trick (*Hudibras*).

SLUR. *s.* (from the verb.) Faint reproach; slight disgrace (*South*).

SLUR, in music, a mark like the arch of a circle, drawn from one note to another, comprehending two or more notes in the same or different degrees. If the notes are in different degrees, it signifies that they are all to be sung to one syllable; for wind instruments, that they are to be made in one continued breath; and for stringed instruments that are struck with a bow, as a violin, &c. that they are made with one stroke. If the notes are in the same degree, it signifies that it is all one note, to be made as long as the whole notes so connected; and this happens most frequently betwixt the last note of one line and the first of the next; which is particularly called syncopation.

SLUT. *s.* (*slodde*, Dutch.) 1. A dirty woman (*King*). 2. A word of slight contempt to a woman (*L'Estrange*).

SLU'TTERY. *s.* (from *slut.*) The qualities or practice of a slut (*Drayton*).

SLU'TTISH. *a.* (from *slut.*) Nasty; not nice; not cleanly; dirty; indecently negligent of cleanliness (*Raleigh*).

SLU'TTISHLY. *ad.* In a sluttish manner; nastily; dirtily.

SLU'TTISHNESS. *s.* The qualities or practice of a slut; nastiness; dirtiness (*Ray*).

SLUYS, a town of the Netherlands, in Flanders, opposite the island of Cadsand, with a good harbour. It has its name from its fine sluices, by which the whole country may be laid under water. It was taken by the Spaniards in 1587, retaken by the Dutch in 1604, and taken by the French in 1794. It is 10 miles N. of Bruges. Lon. 3. 25 E. Lat. 51. 19 N.

SLY. *a.* (ꝛlið, Sax. slippery, and metaphorically deceitful; *slægur*, Islandic.) Meanly artful; secretly insidious (*Fairfax*).

To SMACK. *v. n.* (ꝛmæckan, Sax. *smaceken*, Dutch.) 1. To have a taste; to be tinctured with any particular taste. 2. To have a tincture or quality infused (*Shakspeare*). 3. To make a noise by separation of the lips strongly pressed together, as after a taste (*Gay*). 4. To kiss with a close compression of the lips, so as to be heard when they separate (*Pope*).

To SMACK. *v. a.* 1. To kiss (*Donne*). 2. To make to emit any quick smart noise.

SMACK. *s.* (*smaeck*, Dutch.) 1. Taste; savour. 2. Tincture; quality from something mixed (*Spenser*). 3. A pleasing taste (*Tusser*). 4. A small quantity; a taste (*Dryden*). 5. The act of parting the lips audibly, as after a pleasing taste. 6. A loud kiss (*Donne*).

SMACK, a small vessel with but one mast. Sometimes they are employed as tenders on a man of war, and are used for fishing upon the coast, &c.

SMALL. *a.* (ꝛmall, Sax. *smal*, Dutch.) 1. Little in quantity; not great (*Dryden*). 2. Slender; exile; minute (*Deuteronomy*). 3. Little in degree (*Acts*). 4. Little in importance; petty (*Genesis*). 5. Little in the principal quality; not strong; weak; as, *small* beer (*Swift*).

SMALL. *s.* (from the adjective.) The small or narrow part of any thing (*Sidney*).

SMA'LLAGE. in botany. See APIUM.

SMA'LLCOAL. *s.* (*small* and *coal.*) Little wood coals used to light fires (*Spectator*).

SMA'LLCRAFT. *s.* (*small* and *craft.*) A

little vessel below the denomination of a ship (*Dryden*).

SMA'LLNESS. *s.* (from *small.*) 1. Littleness; not greatness (*Bacon*). 2. Littleness; want of bulk; minuteness; exility (*Bacon*). 3. Want of strength; weakness.

SMALLPO'X. *s.* (*small* and *pox.*) An eruptive distemper of great malignity; *variolæ* (*Wiseman*).

SMA'LLY. *ad.* (from *small.*) In a little quantity; with minuteness; in a little or low degree (*Ascham*).

SMALRIDGE (George), a prelate born at Lichfield, 1666, and educated at Westminster school and Christ-church. He began soon to display his learning and his application, by his publication of animadversions on a piece of Obadiah Walker, on church government, 1687, and 1689 appeared his Latin poem called Auctio Davisiana, &c. on the sale of the books of Davis, the Oxford bookseller. In 1693, he was made prebendary of Lichfield, and afterwards canon of Christ-church, then dean of Carlisle, and in 1713, dean of Christ-church, and the next year bishop of Bristol. He died 1719. He published besides, 12 sermons, and after his death 60 more were published.

SMALT, in mineralogy, a species of cobalt. See COBALTUM.

SMALWELL, a village near Newcastle upon Tyne. At this and the adjacent villages of Winlaton and Winlaton Mills, there are extensive iron works, belonging to the house of Crowley, Millington, and Co. of Thames street. These works were founded by Ambrose Crowley about the beginning of the last century; who, from the profession of a common smith, raised himself to be a sort of legislator. For these three places form a kind of independent republic, which without violating the laws of the kingdom, exist almost without their assistance, by laws of Crowley's enactment. The men employed here are more than a thousand. For an interesting account of the means by which they are restrained from irregularities and enormities see the Athenæum, vol. i. pp. 564—568.

SMARAGD. (Lat. *smaragdus.*) The emerald. In mineralogy. See GEMMA.

SMART. *s.* (ꝼmeoꝛta, Sax. *smert*, Dutch; *smarta*, Swedish.) 1. Quick, pungent, lively pain (*Sidney*). 2. Pain, corporal or intellectual (*Atterbury*).

To SMART. *v. n.* (ꝼmeoꝛtan, Sax. *smerten*, Dutch.) 1. To feel quick lively pain (*Arbuthnot*). 2. To feel pain of body or mind (*Pope*).

SMART. *a.* (from the noun.) 1. Pungent; sharp; causing smart (*Shakspeare*). 2. Quick; vigorous; active (*Clarendon*). 3. Producing any effect with force and vigour (*Dryden*). 4. Acute; witty (*Tillotson*). 5. Brisk; vivacious; lively (*Addison*).

SMART. *s.* A fellow affecting briskness and vivacity. A cant word.

SMART (Christopher), a poet, born April 1722, at Shipbourne, Kent. He was educated at Maidstone and Durham schools, and at 17 entered at Pembroke hall, Cambridge. The death of his father left his affairs embarrassed, but his spirits were not weighed down by family misfortunes, and while he was the companion of the gay, he cultivated the muses, and was thanked for his elegant translation of St. Cecilia's ode, by Pope, who recommended his undertaking a similar translation of the Essay on Criticism. This work was finished with applause, but brought no profit, and also a comedy, a Trip to Cambridge, now forgotten. Afterwards for four successive years he obtained the Seatonian prize. Though the friend of the learned, of Johnson, of Garrick, of Hawksworth, &c. his circumstances, when he removed to London, became more narrow, and totally depended upon the exertions of his pen. His distresses at last were such that they produced occasional derangement in a mind naturally ardent, and that could ill resist the frowns of fortune and of the world, and finally ended in melancholy insanity. A disorder in his liver put an end to his sufferings, 1771. He left a widow and two daughters, settled as booksellers at Reading. His works consist of fables, sonnets, odes, prize poems, &c. printed at Reading, 2 vols. 12mo. 1791. He published besides Horace, translated into English prose—a new Version of the Psalms—Phædrus, translated into verse—Parables in Verse—Old Woman's Magazine, &c. As a poet he possessed originality, and was at times pathetic, and in a few instances has reached the true sublime.

SMA'RTLY. *ad.* (from *smart.*) After a smart manner; sharply; briskly; vigorously; wittily (*Clarendon*).

SMA'RTNESS. *s.* (from *smart.*) 1. The quality of being smart; quickness; vigour (*Boyle*). 2. Liveliness; briskness; wittiness (*Swift*).

SMATCH. *s.* (corrupted from *smack.*) 1. Taste; tincture; twang (*Holder*). 2. A bird.

To SMA'TTER. *v. n.* (supposed to be corrupted from *smack* or *taste.*) 1. To have a slight taste; to have a slight, superficial, and imperfect knowledge (*Watts*). 2. To talk superficially or ignorantly (*Swift*).

SMA'TTER. *s.* (from the verb.) Superficial or slight knowledge (*Temple*).

SMA'TTERER. *s.* (from *smatter.*) One who has a slight or superficial knowledge (*Swift*).

To SMEAR. *v. a.* (ꝼmeꝛan, Sax. *smeeren*, Dutch.) 1. To overspread with something viscous and adhesive; to besmear (*Milton*). 2. To soil; to contaminate (*Shakspeare*).

SMEA'RY. *a.* (from *smear.*) Dauby; adhesive (*Rowe*).

SMEARDAB, in ichthyology. See PLEURONECTES.

SMEATON (John), in biography, an eminent civil engineer, was born the 28th of May, 1724, O.S. at Austhorpe, near Leeds, in a house built by his grandfather, and where his family have resided ever since. The strength of his understanding and the originality of his genius appeared at an early age; his playthings

were not the playthings of children, but the tools which men employ; and he appeared to have greater entertainment in seeing the men in the neighbourhood work, and asking them questions, than in any thing else. One day he was seen, to the distress of his family, on the top of his father's barn, fixing up something like a windmill. Another time he attended some men fixing a pump at a neighbouring village, and observing them cut off a piece of bored pipe, he was so lucky as to procure it, and he actually made with it a working pump that raised water. These anecdotes refer to circumstances that are said to have happened while he was in petticoats, and most likely before he attained his sixth year.

About his fourteenth and fifteenth year he had made for himself an engine for turning, and wrought several presents to his friends of boxes in ivory or wood, very neatly turned. He forged his iron and steel, and melted his metal; he had tools of every sort for working in wood, ivory, and metals. He had made a lathe, by which he had cut a perpetual screw in brass, a thing little known at that day, which was the invention of Mr. Henry Hindley, of York, with whom Mr. Smeaton soon became acquainted, and they spent many a night at Mr. Hindley's house till day-light, conversing on those subjects. Thus had Mr. Smeaton, by the strength of his genius and indefatigable industry, acquired, at the age of eighteen, an extensive set of tools, and the art of working in most of the mechanical trades, without the assistance of any master. A part of every day was generally occupied in forming some ingenious piece of mechanism.

Mr. Smeaton's father was an attorney, and desirous of bringing him up to the same profession; Mr. Smeaton therefore came up to London in 1742, and attended the courts in Westminster Hall; but finding, as his common expression was, that the law did not suit the bent of his genius, he wrote a strong memorial to his father on that subject; whose good sense from that moment left Mr. Smeaton to pursue the dictates of his genius in his own way.

In 1751, he began a course of experiments to try a machine of his invention to measure a ship's way at sea, and also made two voyages in company with Dr. Knight, to try it, and a compass of his own invention and making, which was made magnetical by Dr. Knight's artificial magnets. The second voyage was made in the Fortune sloop of war, commanded at that time by Captain Alexander Campbell.

In 1753, he was elected member of the Royal Society: the number of papers published in their Transactions will show the universality of his genius and knowledge.

In 1759, he was honoured by an unanimous vote with their gold medal, for his paper entitled An experimental Inquiry concerning the natural Powers of Water and Wind to turn Mills, and other Machines, depending on a circular Motion. This paper, he says, was the result of experiments made on working models in the year 1752 and 1753, but not communicated to the Society till 1759; before which time he had an opportunity of putting the effect of these experiments into real practice, in a variety of cases, and for various purposes, so as to assure the Society he had found them to answer.

In December, 1755, the Edystone lighthouse was burnt down. Mr. Weston, the chief proprietor, and the others, being desirous of rebuilding it in the most substantial manner, enquired of the earl of Macclesfield, then President of the Royal Society, whom he thought the most proper to rebuild it; his lordship recommended Mr. Smeaton. Mr. Smeaton undertook the work, and completed it in the summer of 1759. Of this Mr. Smeaton gives an ample description in the volume he published in 1791.

Though Mr. Smeaton completed the building of the Edystone lighthouse in 1759, a work that does him so much credit, yet it appears he did not soon get into full business as a civil engineer; for in 1764, while in Yorkshire, he offered himself a candidate for one of the receivers of the Derwentwater estate; and on the thirty-first of December, in that year, he was appointed, at a full board of Greenwich Hospital, in a manner highly flattering to himself, when two other persons strongly recommended, and powerfully supported, were candidates for the employment. In this appointment he was very happy, by the assistance and abilities of his partner, Mr. Walton, one of the receivers, who taking upon himself the management and accounts, left Mr. Smeaton leisure and opportunity to exert his abilities on public works, as well as to make any improvements in the mills, and in the estates, of Greenwich Hospital. By the year 1775, he had so much business as a civil engineer, that he wished to resign this appointment; and would have done it then, had not his friends, the late Mr. Stuart, the hospital surveyor, and Mr. Ibbetson, their secretary, prevailed upon him to continue in the office about two years longer.

Mr. Smeaton having now got into full business as a civil engineer, performed many works of general utility. He made the river Calder navigable, a work that required great skill and judgment, owing to the very impetuous floods in that river. He planned and attended the execution of the great canal in Scotland, for conveying the trade of the country either to the Atlantic or German Ocean; and having brought it to the place originally intended, he declined a handsome yearly salary, in order that he might attend to the multiplicity of his other business.

On the opening of the great arch at London bridge, the excavation around and under the starlings was so considerable, that the bridge was thought to be in great danger of falling. He was then in Yorkshire, and was sent for by express, and arrived with the utmost dispatch. "I think," says Mr. Holmes, the au-

thor of his life, "it was on a Saturday morning, when the apprehension of the bridge was so general that few would pass over or under it. He applied himself immediately to examine it, and to sound about the starlings as minutely as he could; and the committee being called together adopted his advice, which was to repurchase the stones that had been taken from the middle pier, then lying in Moorfields, and to throw them into the river to guard the starlings." Nothing shows the apprehensions concerning the falling of the bridge more than the alacrity with which this advice was pursued; the stones were repurchased that day, horses, carts, and barges were got ready, and they began the work on Sunday morning. Thus, Mr. Smeaton, in all human probability, saved London bridge from falling, and secured it till more effectual methods could be taken.

The vast variety of mills which Mr. Smeaton constructed, so greatly to the satisfaction and advantage of the owners, will show the great use which he made of his experiments in 1752 and 1753; for he never trusted to theory in any case where he could have an opportunity to investigate it by experiment. He built a steam engine at Austhorpe, and made experiments thereon, purposely to ascertain the power of Newcomen's steam engine, which he improved and brought to a far greater degree of perfection, both in its construction and powers, than it was before.

Mr. Smeaton, during many years of his life, was a frequent attendant on parliament, his opinion being continually called for. And here his strength of judgment and perspicuity of expression had its full display. It was his constant custom, when applied to plan or support any measure, to make himself fully acquainted with it, to see its merits, before he would engage in it. By this caution, added to the clearness of his description and the integrity of his heart, he seldom failed to obtain for the bill which he supported an act of parliament. No one was heard with more attention, nor had any one ever more confidence placed in his testimony. In the courts of law he had several compliments paid him from the bench by lord Mansfield and others, for the new light which he threw on difficult subjects.

About the year 1785, Mr. Smeaton's health began to decline; and he then took the resolution to endeavour to avoid all the business he could, so that he might have leisure to publish an account of his inventions and works, which was certainly the first wish of his heart; for he has often been heard to say, that "he thought he could not render so much service to his country as by doing that." He got only his account of the Edystone lighthouse completed, and some preparations to his intended Treatise on Mills; for he could not resist the solicitations of his friends in various works: and Mr. Aubert, whom he greatly loved and respected, being chosen chairman of Ramsgate harbour, prevailed upon him to accept the place of engineer to that harbour; and to their joint efforts the public is chiefly indebted for the improvements that have been made there within these few years, which fully appears in a report that Mr. Smeaton gave in to the board of trustees in 1791, which they immediately published.

Mr. Smeaton being at Austhorpe, walking in his garden, on the 16th of September, 1792, was struck with the palsy, and died the 28th of October. "In his illness," says Mr. Holmes, "I had several letters from him, signed with his name, but written and signed by another's pen; the diction of them showed that the strength of his mind had not left him. In one, written the 26th of September, after minutely describing his health and feelings, he says, 'In consequence of the foregoing, I conclude myself nine-tenths dead; and the greatest favour the Almighty can do me, as I think, will be to complete the other part; but as it is likely to be a lingering illness, it is only in his power to say when that is likely to happen.'"

Mr. Smeaton had a warmth of expression that might appear to those who did not know him well to border on harshness; but those more intimately acquainted with him knew that it arose from the intense application of his mind, which was always in the pursuit of truth, or engaged in investigating difficult subjects. He would sometimes break out hastily, when any thing was said that did not tally with his ideas; and he would not give up any thing he argued for, till his mind was convinced by sound reasoning. In all the social duties of life he was exemplary; he was a most affectionate husband, a good father, a warm, zealous, and sincere friend, always ready to assist those he respected, and often before it was pointed out to him in what way he could serve them. He was a lover and encourager of merit wherever he found it; and many men are in a great measure indebted to his assistance and advice for their present situation. As a companion, he was always entertaining and instructive; and none could spend any time in his presence without improvement.

As a civil engineer he was perhaps unrivalled, certainly not excelled by any one, either of the present or former times. His building the Edystone lighthouse, were there no other monument of his fame, would establish his character. The Edystone rocks have obtained their name from the great variety of contrary sets of the tide or current in their vicinity. They are situated nearly S.S.W. from the middle of Plymouth Sound. Their distance from the port of Plymouth is about 14 miles. They are almost in the line which joins the Start and the Lizard Points; and as they lie nearly in the direction of vessels coasting up and down the channel, they were unavoidably, before the establishment of a lighthouse there, very dangerous, and often fatal to ships. Their situation with regard to the Bay of Biscay and the Atlantic is such, that they lie open to the swells of the bay and ocean, from all the south-western points of the compass; so that all the heavy seas from the south-west quarter come uncontrolled upon the Edystone rocks, and

break upon them with the utmost fury. Sometimes, when the sea is to all appearance smooth and even, and its surface unruffled by the slightest breeze, the ground swell meeting the slope of the rocks, the sea beats upon them in a frightful manner, so as not only to obstruct any work being done on the rock, or even landing upon it, when, figuratively speaking, you might go to sea in a walnut-shell. That circumstances fraught with danger surrounding it should excite mariners to wish for a light-house is not wonderful; but the danger attending the erection leads us to wonder that any one could be found hardy enough to undertake it. Such a man was first found in the person of Mr. H. Winstanley, who, in the year 1696, was furnished by the Trinity House with the necessary powers. In 1700 it was finished; but in the great storm of November, 1703, it was destroyed, and the projector perished in the ruins. In 1709 another, upon a different construction, was erected by a Mr. Rudyerd, which, in 1755, was unfortunately consumed by fire. The next building was, as we have seen, under the direction of Mr. Smeaton, who, having considered the errors of the former constructions, has judiciously guarded against them, and erected a building, the demolition of which seems little to be dreaded, unless the rock on which it is erected should perish with it. For his works, in constructing bridges, harbours, mills, engines, &c. see his Reports, in 3 vols. 4to. Of his inventions and improvements of philosophical instruments, as of the air pump, the pyrometer, hygrometer, &c. &c. some idea may be formed from the list of his writings. See Hutton's excellent Mathematical and Philosophical Dictionary. See also our article EDYSTONE.

SMEGMA. (from σμαω, to clean.) Soap. Any concrete substance resembling it, as the hardened matter often found, in the morning, on the lachrymal caruncle.

SMEGMATIC. *a.* (σμηγμα.) Soapy; detersive.

To SMELL. *v. a.* pret. and part. *smelt.* (from *smoel*, warm, Dutch; because smells are increased by heat. *Skinner.*) 1. To perceive by the nose (*Collier*). 2. To find out by mental sagacity (*L'Estrange*).

To SMELL. *v. n.* 1. To strike the nostrils (*Bacon*). 2. To have any particular scent (*Brown*). 3. To have a particular tincture or smack of any quality (*Shakspeare*). 4. To practise the act of smelling (*Addison*). 5. To exercise sagacity (*Shakspeare*).

SMELL. *s.* (from the verb.) 1. Power of smelling; the sense of which the nose is the organ (*Davis*). 2. Scent; the power of affecting the nose (*Bacon*).

SMELLER. *s.* (from *smell.*) He who smells.

SMELLFEAST. *s.* (*smell* and *feast.*) A parasite; one who haunts good tables (*L'Estrange*).

SMELLING. To the use of discerning prejudicial food, the sense of smelling is subservient; by which we both perceive their noxious nature, before they be tasted, which might be dangerous; and especially avoid putridity in our victuals, which to us is exceedingly hurtful; and discover what is grateful and wholesome; although, by habit, this advantage of smell is more conspicuous in animals than in man. But men who have been left to themselves, and whose sense of smell has not been corrupted by variety, have been observed most certainly to retain that sagacious faculty in distinguishing food in an eminent degree. The powers of medicinal plants are hardly to be estimated better than by the simple testimonies of taste and smell. Hence, in all animals the organ of smell is placed near the mouth; and hence the smell is stronger, and the organs larger, in those animals which have to seek their prey at a considerable distance, or to reject deleterious plants from among their food.

The sense of smelling is performed by means of a soft, pulpy, vascular, papillous, porous membrane, which lines the whole internal cavity of the nostrils, and is thicker upon the septum, and principal cavity of the nose, but thinner in the sinuses. It is plentifully supplied with very soft nerves, the middle one of which descend from the first pair, through the holes of the os cribrosum to the septum narium; but in such a manner, that it is very difficult to trace them to their extremities and into the septum. Other lateral nerves come from the second branch of the fifth pair and its branches, from that which crosses the pterygoid canal, and from another which descends through the canals of the palate; and in the maxillary sinus from the infra-orbital branch, from the dental branch, and from the anterior nerve of the palate. Moreover, the anterior part of the septum has a twig from the ophthalmic of the first branch of the fifth pair.

The nostrils are supplied with very numerous arteries; from the three nasal branches of the internal maxillary, above, from both the ethmoidal branches, and the frontal and nasal branches, with lateral arteries from the smaller ophthalmic branch of the internal carotid, and from branches of the palatine artery, and in the sinuses from the infra-orbital, and from the superior dental one. These arteries have the property of exuding blood easily, and in great quantity, without any lesion of consequence. The correspondent veins form a very large plexus upon the external pterygoid muscle; then communicate with the sinuses of the dura mater; and, lastly, meet in the external branch of the internal jugular. The arteries supply nourishment, warmth, and mucus.

The head, especially in man, being of a spherical figure, confines the organ of smell within a small space. That it may be extended internally the nostrils have been made complicated and cavernous in a surprising manner. In the first place, the nostrils are that multiform cavity which begins at the anterior openings of the nose, and extending transversely backwards over the roof of the palate under the ethmoid bone, terminates at the cavity of

the fauces. This cavity is divided by the septum, often unequally, which is bony in the upper part, and descends from the plate of the ethmoid; below, it is formed by the vomer, and in its fore-part it consists of a triangular cartilage, whose surface is large and very sensible.

Moreover, the lateral surfaces of the nares are increased by the spiral convolutions of the ossa turbinata; the uppermost of which are the small superior and posterior convolutions of the ethmoid bone. The middle ones belong to the same bone, are of a long conchoid form, convex inwards, externally concave, pointed at both ends, covered all over with pits, and internally filled with spongy cells, suspended transversely, and supported by particular eminences of the palate and maxillary bones. The lowest turbinata are similar to the middle ones; like them resemble in figure a limpet-shell, but longer; are for the most part divided from the former, but sometimes conjoined by a bony plate, which is most frequently of a membranous nature. This appendix, being extended upwards in a square form, completes the maxillary sinus.

The cavity of the nostrils is still further enlarged, by means of the various sinuses, which are recesses or a kind of appendages to the nostrils. The uppermost of these are the frontal sinuses, which are inconstant and irregular, seated in the superciliary ridge, and situated betwixt the anterior and posterior plates of the frontal bone. They are not found in the fetus, and seem to arise from the action of the corrugator and other muscles, which draw the anterior plate outwards, and increase the diploë into cells, in the same manner as in the mastoid process. These open in the upper part of the nostrils into the anterior cell of the os papyraceum. There are instances of their being totally wanting, and growing after birth.

The second in order are the ethmoidal sinuses; of which four or more on each side are found in the outer part of the os cribrosum, like the cells of an honey-comb; above they are completed by the cellular diploë of the os frontis, before by the os unguis, and behind by the palate and sphenoidal bone; they open into the upper part of the nostrils in a transverse line, by many small tubes, even placed one above another. With these are continuous the cells in the bottom of the orbit, and those excavated in the os planum and maxillare are outwardly continued from them. In the third place, the large cavity of the multiform bone on each side is also contiguous, and in some measure belongs to the ethmoid and palate bones. By the drying up of the cartilage, which is here of large extent in the fetus, it gradually is formed in the solid bone, under the sella turcica, is capacious, either single or divided, and opens forwards by its aperture into the upper passage of the nostrils.

The last, lowest, and largest of the sinuses, which in the fetus exists in some degree, but in the adult, by the attenuation of the bony laminæ, becomes very large, is chiefly excavated in the upper maxillary bone. Its opening into the nostrils is bounded by the os unguis, bone of the palate, proper lamella of the lowest os turbinatum, and by membranes, so that it enters by a round aperture between the middle and lowest spongy bones. But it likewise sends forth an hollow appendix, stretching forwards under the orbits, which is formed by the os planum, unguis, and papyraceum, communicating likewise with the ethmoidal cells, and opening behind the ostium lachrymale.

The nerves of the nose, being almost naked, require a defence from the air, which is continually inspired and expired through the nostrils, for the purposes of respiration. Nature has therefore supplied the nostrils, in place of a thicker cuticle, with a viscid, bland, insipid mucus, fluid at its first separation, but by the air condensing into thick dry crusts, and more consistent here than in the other parts of the body. By this mucus the nerves are defended from drying and from pain. It is poured out from the very numerous small arteries of the nostrils; and is deposited partly into numerous cylindrical ducts, and partly into round visible cryptæ, scattered throughout the nostrils. The same mucus exudes over the surface of the whole olfactory membrane, and every where anoints it. In the septum, a long sinus, common to many muciferous pores, runs forwards a considerable way. The mucus accumulated in the night-time, in too great quantity, is expelled during the day by compressing the nostrils, and forcing the breath through them; or by its dryness and acrimony it irritates the very sensible nerves, and is then expelled by the sneezing excited. But the sinuses which abound with mucus, evacuate it according to the different postures of the body; by some of them always being at liberty to discharge it, whether the head be erect or inclined forwards, or to the side; yet so, that generally the maxillary and sphenoidal sinuses are more difficultly emptied than the rest. Moreover, the tears descend through a proper duct into the nostrils, and moisten them, and dilute the mucus.

The extremities of the nostrils are covered by the nose, which is lined inwardly with a membrane of the same nature, and is composed of two bones, and usually six cartilages, two of which are continuous with the middle septum. The nose may be moved by its muscles, so as to be raised and dilated by a muscle common to it and the upper lip, and to be contracted by its proper depressor and compressor, and depressor of the septum. Thus the organ of smell is prominent, and exposed to the action of odours, and may be dilated for taking in a larger quantity of air, and again be contracted, when the superabundance is expelled.

The air, therefore, filled with the very subtile, invisible, pungent, oily, saline, and volatile effluvia, which exhale from almost every known body, being received into the nostrils, by the action of respiration, and by a peculiar effort for drawing the air into them, carries these particles to the nerves, widely naked, and

constantly soft. By these there is excited in the nerves a kind of sensation which we call smell, by which we distinguish the several kinds of oils and salts, in a manner somewhat indistinct, difficultly reducible to classes, difficultly recalled to the memory, nevertheless sufficiently for our purposes. This sense informs us of unwholesome putridity, of excessive acrimony, and of the bland and useful nature of substances. And as salt, united with oil, is an object of taste, and as oils, combined with salts, constitute odours, the affinity of the two senses, which was necessary to derive utility from either is apparent. But volatile particles chiefly are distinguished by smell, and fixed ones by the taste; perhaps because the thick mucous cuticle, spread over the tongue, intercepts the action of the more subtile salts, which easily affect the softer and less covered nerves of the nostrils. We are ignorant of the reasons why some smells please, and others displease; perhaps custom may have some influence in this respect.

The action of smells is strong, but of short continuance; because particles in a very minute state are applied to naked nerves, in the immediate vicinity of the brain. Hence the deleterious and refreshing actions of odours, by which people are resuscitated from faintings, and even from drowning. Hence the violent sneezing, excited by acrid particles, the evacuation of the bowels, by the smell of purgatives, and in some few cases, perhaps, though by no means always, the power of antipathies. Hence the pernicious effects of excessive sneezing, more especially blindness, from the great sympathy of the nerves. Amongst the various parts of the nostrils, the septum, and the ossa turbinata, and their anterior portions, especially form the organ of smell: since these parts are multiplied in quick-scented animals, forming beautiful spires in quadrupeds; and in fish, being distributed in parallel laminæ elegantly toothed.

Scent differs from smell, as the thing perceived differs from the percipient organ, though the latter term is sometimes used for the effluent body, as well as for the sense discerning it. Scent is the effluvium continually arising from the corpuscles that issue out of all bodies; which being impregnated with the peculiar state and quality of the blood and juices of the particular animal or other subject from which they flow, occasions the vast variety of perceptions cognizable by the olfactory nerves: hence the reason why one person differs from another in his scent, and why a dog will trace the footsteps of his master for a hundred miles together, following him into any house, church, or other building, though surrounded by ten thousand: and when the faithful animal has thus diligently sought out and recognized his master, he is seldom willing even to trust the evidence of his own eyes, until, with erected crest, he has taken a few cordial sniffs to convince himself he is right. Hence also we perceive how a pack of hounds are enabled to pursue hare, fox, stag, or any other animal they are trained to hunt, across the scent, and amidst the society of others of the same species, without being diverted from the pursuit of that self same animal they had first on foot; and hence too we discover how it is possible for birds and beasts of prey to be directed to their food at such vast distances; for these corpuscles issuing from putrid bodies, and floating in the air, are carried by the wind to different quarters; where striking the olfactory nerves of animals they meet in their way, and whose olfactory nerves are susceptible of the impression, immediately conduct them to the spot.

It matters not how much the effluvia may have escaped, provided enough remain to irritate the olfactory organ: for whether it be bird or beast, they try the scent in all directions, till at length they discover that which is stronger and stronger, in proportion as they proceed; and this is the mode by which nature directs them to their prey, and prevents them from following a contrary course, which is naturally weaker and weaker, and what in hunting is called *heel*. This observation is confirmed by the increasing eagerness we perceive in all animals the nearer they approach the object of pursuit; thus we see hounds and spaniels in hunting and shooting are more earnest, in proportion as the scent is recent, and they draw nearer to the game. The same thing amongst quadrupeds, whether wild or domestic, directs the male to the female and forms the season of love; and hence we see the dog, the boar, the bull, and the stallion, when turned loose, apply their nostrils to the ambient air, and proceed accordingly. By the same medium the vermin which infest our dwellings know how to direct their operations; whether to undermine walls, eat through solid boards, cross rivers, or climb spouts; which proves also how much stronger the faculty of smelling is possessed by the brute than the human species; wisely augmented by nature, to enable them to seek their food, and propagate their species; and but for which they would often perish, or have long since become extinct.

The power or degree of scent seems to depend on a variety of circumstances. Quietude and elasticity in the air constitute perhaps the chief. But its strength or forcible communication does not depend upon the air alone. It depends also on the soil. In hunting, without doubt, the best scent is that which is occasioned by the effluvia, constantly and without intermixture perspiring from game as it runs; which are strongest and most favourable to the hound, when kept by the gravity of the air to the height of his breast: for then it is neither above his reach, nor is it necessary he should stoop for it. At such times scent is said to lie breast high. Experience however tells us, that difference of soil occasions difference in the degree of scent; and on the richness and moderate moistness of the same soil it seems also to depend. At the time leaves begin to fall, and before they are rotted, we know that the scent lies ill in covert. This alone would be a sufficient proof that scent does not depend

on the air only. A difference of scent is also occasioned by a difference of motion; the faster the game proceeds the less scent it leaves. When game has been ridden after, and hurried on by imprudent sportsmen, the scent is less favourable to hounds; one reason of which may be, that the particles of scent are then more dissipated. But if the game should have been run by a dog not belonging to the pack, seldom will any scent remain. The condition of the ground therefore seems to be of as much consequence as the temperature of the air; both of which should be moist, without being wet; and when both are in this condition, the scent is perfect; while, when the ground is hard, and the air dry, there will seldom be any scent whatever. It scarcely ever lies with a north or an east wind; a southerly wind without rain, and a westerly wind that is not rough, are the most favourable. Storms in the air are great enemies to scent, and seldom fail to take it entirely away. A fine sun-shiny day is not often a good hunting day; but what the French call *jours des dames*, lady-days, warm without sun, are generally perfect days: there are not many such in a whole season. In some fogs the scent will be high, in others not at all; depending, perhaps, on the quarter the wind is then in. It lies very high at times in a mist, when not very wet; but if the wet hang on the boughs and bushes, it will fall upon the scent and deaden it. When the dogs roll, the scent seldom lies; but, if they smell strong when first they come out of the kennel, the proverb is in their favour; and that smell is a prognostic of good luck.

When cobwebs hang on the bushes, there is seldom much scent. During a white frost the scent lies high; as it also does when the frost is quite gone: at the time of its going off scent never lies: it is a critical minute for hounds, in which their game is frequently lost. In a great dew, the scent is the same. In heathy countries, where the game brushes as it goes along, scent seldom fails. Where the ground carries, the scent is bad, for a very evident reason, which hare-hunters, who pursue their game over greasy fallows, and through dirty roads, have great reason to complain of. A wet night frequently produces good chases, as then the game neither likes to run the covert, nor the roads. It has been often remarked, that scent lies best in the richest soils; and countries which are favourable to horses, are seldom so to hounds. In other places, again, let the temperature of the air be as it may, scent never lies.

SMELT. The pret. and part. pass. of *smell*.

SMELT, in ichthyology. See SALMO.

To SMELT. *v. a.* (*smelten*, Dutch.) To melt ore, so as to extract the metal (*Woodward*).

SME'LTER. *s.* (from *smelt*.) One who melts ore (*Woodward*).

SMELTING. (*schmeltzung*, German.) The reduction of metallic ores, and fusion of metals in the large way.

SMERDIS, a son of Cyrus the Great, put to death by order of his brother Cambyses. As his execution was only known to one of the officers of the monarch, one of the Magi, who was himself called Smerdis, and who greatly resembled the deceased prince, declared himself king, at the death of Cambyses. After he had reigned for six months, seven noblemen of Persia conspired to dethrone him, and when this had been executed with success, they chose one Darius, the son of Hystaspes, one of their number, to reign in the usurper's place, B. C. 521.

To SMERK. *v. a.* (rmeɹcian, Saxon.) To smile wantonly (*Swift*).

SME'RKY, or SMERK. *a.* Nice; smart; jaunty (*Spenser*).

SMEW, in ornithology. See MERGUS.

SMI'CKET. *s.* The under garment of a woman.

To SMIGHT, for *smite* (*Spenser*).

SMILACINA, in botany, a genus of the class and order hexandria, monogynia. Calyx-less: corol six-petalled, divided, stellately-patent: filaments divergent, jagged: germ superior: berry sphærical, trilobate. Two species.

1. S. umbellata. Umbel-flowered smilacina.

2. S. borealis. Northern smilacina. The principal difference of the species is in the umbel. Borealis approaches in many respects to uvularia, as umbellata does, on the contrary, to convallaria. The leaves are similar, which are three or four radical, or one subcauline, oblong-ovate, of a deep green, upwards rounded with a point, downwards tapered, ambient, from upwards diverging, twice shorter than the scape, polished below, ciliate at the edge; scape central, simple, leaveless below; bractes very small, caducous. The first was found by Michaux on the Alleghany mountains, who describes the bloom as fragrant. The second was introduced into our own country in 1778 by Dr. Solander, from Newfoundland, and the neighbourhood of Halifax in Nova Scotia. Both species are hardy, and bloom together in June. See Botany, Plates CXLII, and CXLIII.

SMILAX, in botany, a genus of the class dicœcia, order pentandria. Calyx six-leaved; corolless. Female: styles three; berry three-celled; seeds two. Twenty-three species; natives of the East or West Indies or America, one of the south of Europe, one of Syria, one of New Holland. They are thus subdivided.

A. Stem prickly, angular.

B. Stem prickly, round.

C. Stem unarmed, angular.

The following are cultivated.

1. S. aspera. Rough smilax.

2. S. excelsa. Tall smilax.

3. S. sarsaparilla. Sarsaparilla or medicinal smilax.

4. S. laurifolia. Bay-leaved smilax.

5. S. tamnoides. Black-briony-leaved smilax.

6. S. herbacea. Herbaceous smilax.

7. S. China. Chinese smilax.
8. S. pseudo-China. Bastard-Chinese smilax.

The roots of the China species were formerly in high vogue, and those of the sarsaparilla still preserve their character, as an alterative and general detergent: for their virtues of this kind, see CHINA and SARSAPARILLA. This last delights in low moist grounds, near the banks of rivers. The roots run superficially under the soil; and the gatherers have only to loosen the soil a little, when they may draw out a great length of the fibres with a wooden hook. It is thus collected, cleared of its mud, dried, and made into bundles. This plant is a native of America. The China root has roundish prickly stalks and red berries, and is a native of China and Japan. The pseudo-China has round smooth stalks and black berries; it grows wild in Jamaica and Virginia, and bears the cold of England without injury. The two last should be increased by layers of the young shoots and dividing the roots. All the rest may be propagated by slipping the roots, by layers, and seeds.

To SMILE. *v. n.* (*smuylen*, Dutch.) 1. To contract the face with pleasure; to express gladness by the countenance (*Tatler*). 2. To express slight contempt by the look (*Camden*). 3. To look gay or joyous (*Milton*). 4. To be favourable; to be propitious (*Milton*).

SMILE. *s.* (from the verb.) A slight contraction of the face; a look of pleasure or kindness: opposed to *frown* (*Wotton*).

SMI'LINGLY. *ad.* (from *smiling*.) With a look of pleasure.

To SMIRCH. *v. a.* (from *murk*, or *murky*.) To cloud; to dusk; to soil (*Shakspeare*).

SMIRIS. Emery. In mineralogy, a genus of the class earths, order siliceous. Consisting of alumina, silica, and a large quantity of iron; very hard, of a common form, opake, attracted by the magnet, red when powdered; not fusible per se. One species only: S. poliens, polishing emery: found at Guernsey, in Germany, Italy, and Spain, in the islands of the Archipelago, but is usually imported from the isle of Naxos, always in shapeless masses, and mixed with other minerals; colour greyish-black; has a granular texture, and is so hard as to cut all stones except the diamond, upon which account it is principally used in the form of powder for polishing metals: specific gravity about 400.

To SMIRK. *v. a.* To look affectedly soft or kind (*Young*).

SMIT. The participle passive of *smite*.

To SMITE. *v. a.* pret. *smote*; part. pass. *smit*, *smitten*. (ꝛmitan, Saxon; *smijten*, Dut.) 1. To strike; to reach with a blow (*Ezekiel*). 2. To kill; to destroy (*Samuel*). 3. To afflict; to chasten (*Wake*). 4. To blast (*Exodus*). 5. To affect with any passion (*Milton*).

To SMITE. *v. n.* To strike; to collide (*Nahum*).

SMI'TER. *s.* He who smites (*Isaiah*).

SMITH. *s.* (ꝛmiꝺ, Saxon; *smeth*, Germ.) 1. One who forges with his hammer; one who works in metals (*Tate*). 2. He that makes or effects any thing (*Dryden*).

SMITH (George), a landscape painter, born at Chichester 1714. His abilities gained some prizes at the society of arts. He died 1776. He had two brothers, William and John. William the eldest excelled as a portrait painter, and in his fruit pieces, and died 1764; and John, whose landscapes were much admired, died the same year.

SMITH (William), of Worcester, was educated at Winchester and New college, and became rector of Trinity church, Chester. He was for one year at the head of Brentwood school, Essex, but resigned in 1749, and in 1758 was made dean of Chester, and in 1756, rector of Handley. His life was spent in the service of literature, and of the church, and he published an elegant translation of Thucydides, and of Longinus, besides a volume of sermons on the Beatitudes. He died 1787.

SMITH (Adam), LL.D. was born the 5th of June, 1723, at Kirkaldy, where his father, who died a few months before his birth, was comptroller of the customs. At the age of three he was stolen by some vagrants, and with difficulty recovered. He was educated at Kirkaldy and Glasgow university, but as his friends destined him for the church of England, he removed in 1740, to Baliol college, Oxford. Not wishing, however, to embrace the ecclesiastical profession, he left Oxford after seven years' residence, and returned to Scotland, and in 1751 was elected professor of logic in the university of Glasgow, and the next year of moral philosophy. In 1759 he published his Theory of moral Sentiments, and in 1763 he quitted his professorship to accompany the duke of Buccleugh in his travels. He visited during three years Toulouse, Geneva, and the south of France, and became acquainted with the wits and learned men of the capital. He then retired to the domestic seclusion of Kirkaldy with his mother for 10 years. Hume and his friends in vain expostulated against it, but in 1771 he convinced them that his mind had been actively employed, by the publication of his celebrated work, an Inquiry into the Nature and Causes of the Wealth of Nations, 2 vols. 4to. This excellent book often republished in 3 vols. 8vo. procured him the appointment of commissioner of the customs in Scotland, and after being some time in London, he in 1778 retired to Edinburgh, where he enjoyed the rest of life in honourable independence. He occasionally devoted himself to study, but not with that zeal which might have enabled him to add fresh celebrity to his fame; and when infirmities came upon him, he found it was too late to think of completing the works which he had meditated. He died July 1790, of a chronic obstruction in his bowels, and after his death some essays and other miscellanies were published in 4to. 1795. Of the powers of his mind, and of his comprehensive information, his works will be a lasting memorial to the latest posterity. He did not however possess that knowledge of the world

which might have adorned a more active life, and though admired for his talents, he was careless and absent to an extraordinary degree. It is to be lamented that his great qualities were disgraced by a decided infidelity. When he published the life of David Hume, written by himself, he added remarks which showed to the world how determined a foe he was to christianity: this, however, proved ultimately a blessing to the world; as it led first to the publication of bishop Horne's admirable letter to him, and afterwards to that prelate's valuable series of Letters on Infidelity.

SMITH (Charlotte), daughter of Mr. Turner, a man of property in Surry and Sussex, when very young married Mr. Smith, whose father possessed some estates in the West Indies. The affairs of her husband not proving prosperous, she after various persecutions from creditors, and after passing some time in the gloom of a prison with her consort, retired to a chateau in Normandy. Here the chicanery of the lawyers, and the ingratitude of her friends, reduced her to indigence, yet the exertion of her mind administered to her wants. She wrote several novels which gained her a comfortable subsistence, and the Romance of Real Life, Emmeline, Ethelinda, Celestina, Desmond, the Old Manor House, Poems, Sonnets, &c. procured her the public esteem, and a respectable income. She died at Thetford, near Farnham, Surry, 1806. Her novels display great powers of invention, and it is remarkable that in all of them she has interwoven much of her own personal misfortunes, and painted every where, in strong colours, the character of those rapacious lawyers, to whose dishonesty she ascribed all her sorrows. Her descriptions are interesting, and her style is elegant. Her sonnets possess peculiar beauty, and all her writings every where display the powers of a fine imagination, correct taste, and strong judgment.

SMI'THCRAFT. *s.* (ꝛmiðcꝛæꝛꝛ, Sax.) The art of a smith (*Raleigh*).

SMI'THERY. *s.* (from *smith.*) The shop of a smith.

SMITHIA, in botany, a genus of the class diadelphia, order decandria. Calyx bifid, two-lipped; stamens divided into two equal bodies; loment with distinct one-seeded joints, connected on one side by the style. One species only; an East Indian plant, with decumbent stem, leaves abruptly pinnate; calyx with bristly tubercles; corol yellow.

SMI'THING. *s.* (from *smith.*) An art manual, by which an irregular lump of iron is wrought into an intended shape (*Moxon*).

SMI'THY. *s.* (ꝛmiððe, Saxon.) The shop of a smith (*Dryden*).

SMITHVILLE, a town of N. Carolina, chief of Brunswick county, seated near the mouth of Cape Fear river, 25 miles S.S.W. of Wilmington. Lon. 78. 30 W. Lat. 33. 50 N.

SMI'TTEN. (part. pass. of *smite.*) Struck; killed; affected with passion (*Ecclus*).

SMOCK. *s.* (ꝛmoc, Saxon.) The under garment of a woman; a shift (*Sandys*).

SMOCKFA'CED. *a.* (*smock* and *face.*) Palefaced; maidenly (*Fenton*).

SMOKE. *s.* (ꝛmoec, Saxon; *smook*, Dut.) The visible effluvium, or sooty exhalation, from any thing burning (*Cowley*).

To SMOKE. *v. n.* (from the noun.) 1. To emit a dark exhalation by heat (*Milton*). 2. To burn; to be kindled (*Deuteronomy*). 3. To move with such swiftness as to kindle (*Dryden*). 4. To smell or hunt out (*Hudibras*). 5. To use tobacco. 6. To suffer; to be punished (*Shakspeare*).

To SMOKE. *v. a.* 1. To scent by smoke; to medicate by smoke, or dry in smoke (*Arbuthnot*). 2. To smell out; to find out (*Shaksp.*). 3. To sneer; to ridicule to the face (*Congreve*).

To SMOKE-DRY. *v. a.* (*smoke* and *dry.*) To dry by smoke (*Mortimer*).

SMO'KER. *s.* (from *smoke.*) 1. One that dries or perfumes by smoke. 2. One that uses tobacco.

SMOKE-JACK. This ingenious machine is of German extraction; and Messinger, in his Collection of Mechanical Performances, says it is very ancient, being represented in a painting at Nurenberg, which is known to be older than the year 1350. Its construction is simple. An upright iron spindle placed in the narrow part of the kitchen chimney, turns round on two pivots. The upper one passes through an iron bar, which is built in across the chimney; and the lower pivot is of tempered steel, and is conical or pointed, resting in a conical bell-metal socket fixed on another cross bar. On the upper end of the spindle is a circular fly, consisting of 4, 6, 8, or more thin iron plates, set obliquely on the spindle like the sails of a windmill. Near the lower end of the spindle is a pinion, which works in the teeth of a contrate or face wheel, turning on a horizontal axis. One pivot of this axis turns in a cock fixed on the cross bar, which supports the lower end of the upright spindle, and the other pivot turns in a cock fixed on the side wall of the chimney; so that this axle is parallel to the front of the chimney. On the remote end of this horizontal axle there is a small pulley, having a deep angular groove. Over this pulley there passes a chain, in the lower bight of which hangs the large pulley of the spit. This end of the spit turns loosely between the branches of the fork of the rack or raxe, but without resting on it. This is on the top of a moveable stand, which can be shifted nearer to or further from the fire. The other end turns in one of the notches of another rack. The number of teeth in the pinion and wheel, and the diameters of the pulleys, are so proportioned that the fly makes from 12 to 20 turns for one turn of the spit.

The manner of operation of this useful machine is too well understood to need a particular description.

SMOKING, a practice of consuming tobacco, by which the cut leaves of this drug,

being previously put into a pipe, are kindled; and the fume or smoke, after being inhaled, is discharged through the mouth.

Smoking has been strongly recommended by Dr. Short, on account of its beneficial effects to persons of gross, phlegmatic, and corpulent habits; as the fumes of tobacco are supposed to accelerate the slow circulation of their blood. It is, likewise, said to be occasionally useful to such as are liable to catarrhs, especially during chilly and damp weather, provided it does not exceed the limits of moderation; but persons of this description ought always to employ a long and thoroughly clean pipe, frequently taking a little beer, tea, or similar diluent liquors: they should, however, not resort to such practice a short time before or after meals, because it then materially contributes to retard digestion.

No young people, especially those of lean habits, should indulge in smoking; for though in certain cases it may be productive of advantage, it is to them extremely detrimental; exciting giddiness, nausea, violent purging, &c. in consequence of which, many persons have contracted the disgusting practice of parting with their saliva every minute; and have thus eventually smoked themselves into a consumption.

Farther, habitual smoking during the summer is more prejudicial to health than in the winter, from the increased evacuation of saliva, which it necessarily occasions; and from its being also apt to render the body feverish. Another inconvenience attending this practice is, that it renders the teeth of a yellow or black hue; and, while foul pipes are employed, it is apt to corrode these useful bones, so as to taint the breath, and even to induce putrid ulcers in the gums. Hence, we seriously advise all persons carefully to refrain from this absurd custom, unless it be indicated as a medicine, in the cases above-mentioned; for it not only vitiates their fluids, but weakens the digestion, and eventually impairs, or at least stupefies, the energy of the mind.

SMOKING, in domestic economy, is a mode of preserving meat, such as hams, bacon, geese, &c. by previously salting, and then exposing them to the smoke arising from a wood-fire. For this purpose, the chimney is usually furnished with recesses or lofts; which, communicating with the funnel itself, in a lateral direction, do not admit a large volume of smoke to pervade the articles there suspended; but, as the latter gradually receive the ascending fumes, they become impregnated with them in a more uniform and effectual manner.—In this country, where coal is the general fuel, it becomes more difficult to smoke hams, and other meat: hence, epicures have contrived a method of effecting that object, by means of small chimnies purposely built, with a hearth below, where they kindle a wood-fire, especially from the branches of the juniper tree, the fumes of which impart to the flesh of animals a very agreeable, pungent flavour.

SMO'KELESS. *a.* (from *smoke*.) Having n smoke (*Pope*).

SMO'KY. *a.* (from *smoke*.) 1. Emitting smoke; fumid (*Shakspeare*). 2. Having the appearance or nature of smoke (*Harvey*). 3. Noisome with smoke (*Milton*).

SMOLAND, or SMALAND, a province of Sweden, in Gothland, extending 140 miles E. and W. from the Categat to the Baltic, and from 40 to 70 in breadth. It has immense forests of pine and fir; and the approach to the villages is announced by groves of oak, beech, and birch, and numerous plots or parterres of arable land among pastures and rocks. In many parts the trees are cut down, and burnt in order to manure the soil. Calmar is the capital.

SMOLENSKO, a duchy of Russia, on the frontiers of Lithuania. After having been an object of contention, and reciprocally possessed by Poland and Russia, it was conquered by Alexay Michaelovitch in 1654, and ceded to Russia by the peace of Moscow in 1666. It now forms one of the 41 Russian governments.

SMOLENSKO, a city of Russia, capital of a government of the same name. It is situate on the Dnieper, and extends over two mountains and the valley between them. It is surrounded by walls 30 feet high and 15 thick; the lower part of stone, the upper of brick, and their circumference four miles and three quarters. The houses are mostly of wood, and little better than cottages: they are only of one story, except a few scattered here and there, which are dignified with the title of palaces. The city is divided, through its whole length, by one straight paved street; the others are circular, and floored with planks. The cathedral stands on an eminence, where there is a view of the whole city. The alternate rising and sinking of the walls from the inequality of the ground; their Gothic architecture and grotesque towers; the steeples rising above the trees, which conceal the houses from the sight; the gardens, meadows, and corn-fields within the walls; all together form one of the most singular, picturesque, and varied prospects. Notwithstanding its extent, it contains only about 4000 inhabitants, and has no manufactures, but carries on with Dantzic, Riga, and the Ukraine, a petty traffic, in linen, hemp, honey, wax, leather, furs, &c. It is 197 miles N.E. of Novogrodeck, and 230 N. of Kiof. Lon. 32. 34 E. Lat. 54. 50 N.

SMOLLETT (Tobias), M. D. a celebrated author, born near Cameron on the banks of the Leven, 1720. He was brought up for the medical profession, and served as a surgeon at the bombardment of Carthagena; but as he did not meet encouragement, he commenced author. After trying his fortune in plays and poems, he published in 1748 his Roderick Random, 2 vols. 12mo. which ensured success to his future publications. Peregrine Pickle appeared in 1751, 4 vols. 12mo. and became popular from its own intrinsic merit, and for

the adventures of a lady of quality, lady Vane, and for the entertainment of a republican doctor, supposed to be Akenside, pourtrayed with all the skill of a most facetious scholar. Ferdinand Count Fathom appeared in 1754, and the next year the Critical Review was undertaken, and conducted by him till 1763. In this work his censure on admiral Knowles' pamphlet on the Rochefort expedition brought on a prosecution against him. He was in consequence fined 100*l.* and imprisoned in the King's Bench three months, during which confinement he wrote his Sir Launcelot Greaves, 2 vols. 12mo. In 1762 he defended lord Bute's administration, and published the Briton, which was immediately followed by the North Briton. In 1763 he went abroad for his health, and returned after two years' absence, and published an account of his travels, 2 vols. 8vo. a work which Sterne ridicules under the name of Smelfungus. His Humphrey Clinker appeared in 1771, and soon after he left England for Italy. He died in Italy, 21st Oct. 1771, and an epitaph on his monument, by his friend Armstrong, marks the spot of his interment near Leghorn. Besides these works; Smollett published 1757, an History of England, 4 vols. 4to. edited also in 8vo. a work which produced him great profit, though hastily written—a Translation of Gil Blas and Don Quixote into English—a Collection of Voyages and Travels—the Regicide—Poems, &c. His life has been written by Dr. Anderson, 1796, and since by Dr. Moore. In his character Smollett was in the main a man of virtue and probity, and his abilities rank him high in the list of authors of celebrity. His two best works are Roderick Random and Peregrine Pickle, and in these he introduces great diversity of characters, interesting descriptions, and humorous incidents; though it is to be lamented that some parts have a shockingly licentious tendency. His other novels are inferior performances, though they are not devoid of interesting anecdotes. The mortifications and disappointments to which he was exposed by the spirit of faction, and the persecution of enemies, were increased by the loss of his daughter, an only child; and he must be added to the number of those who, after contributing to the amusement, and in some respects, to the improvement of the public, experienced vexation, disquiet, and neglect.

SMOOTH. *a.* (ꝑmeð, ꝑmoeð, Sax. *smwyth*, Welsh.) 1. Even on the surface; not rough; level; having no asperities (*Milton*). 2. Evenly spread; glossy (*Pope*). 3. Equal in pace; without starts or obstruction (*Milton*). 4. Gently flowing (*Milton*). 5. Voluble; not harsh; soft (*Gay*). 6. Bland; mild; adulatory (*Milton*).

To SMOOTH. *v. a.* (from the adjective.) 1. To level; to make even on the surface (*Sh.*). 2. To work into a soft uniform mass (*Ray*). 3. To make easy; to rid from obstructions (*Pope*). 4. To make flowing; to free from harshness (*Milton*). 5. To palliate; to soften (*Shakspeare*). 6. To calm; to mollify (*Milt.*). 7. To ease (*Dryden*). 8. To flatter; to soften with blandishments (*Shakspeare*).

To SMO'OTHEN. *v. a.* (a bad word for *smooth.*) To make even and smooth (*Moxon*).

SMO'OTHFACED. *a.* (*smooth* and *face.*) Mild looking; having a soft air (*Shakspeare*).

SMOOTH-HOUND, in ichthyology. See SQUALUS.

SMO'OTHLY. *ad.* (from *smooth.*) 1. Not roughly; evenly. 2. With even glide (*Pope*). 3. Without obstruction; easily; readily (*Hooker*). 4. With soft and bland language.

SMO'OTHNESS. *s.* (from *smooth.*) 1. Evenness on the surface; freedom from asperity (*Bacon*). 2. Softness or mildness on the palate (*Philips*). 3. Sweetness and softness of numbers (*Dryden*). 4. Blandness and gentleness of speech (*Shakspeare*).

SMOTE. The preterit of *smite*.

To SMO'THER. *v. a.* (ꝑmoþan, Saxon.) 1. To suffocate with smoke, or by exclusion of the air (*Sidney*). 2. To suppress (*Hooker*).

SMO'THER. *s.* (from the verb.) 1. A state of suppression: not used (*Bacon*). 2. Smoke; thick dust (*Collier*).

To SMO'THER. *v. n.* (from the noun.) 1. To smoke without vent (*Bacon*). 2. To be suppressed or kept close (*Collier*).

SMO'ULDERING. SMO'ULDRY. (ꝑmoþan, Saxon; to smother; *smoel*, Dutch, hot.) Burning and smoking without vent (*Dryden*).

SMUG. *a.* (*smuck*, dress; *smucken*, to dress, Dutch.) Nice; spruce; dressed with affectation of niceness (*Spectator*).

To SMU'GGLE. *v. a.* (*smockelen*, Dutch.) To import or export goods without paying the customs.

SMU'GGLER. *s.* (from *smuggle.*) A wretch who imports or exports goods either contraband or without payment of the customs.

As duties imposed upon the importation of goods necessarily raise their price above what they might otherwise have been sold for, a temptation is presented to import the commodity clandestinely and to evade the duty. Many persons, prompted by the hopes of gain, and considering the violation of a positive law of this nature as in no respect criminal (an idea in which they have been encouraged by a great part of the community, who make no scruple to purchase smuggled goods), have engaged in this illicit trade. It was impossible that government could permit this practice, which is highly injurious to the fair trader, as the smuggler is enabled to undersell him, while at the same time he impairs the national revenue, and thus wholly destroys the end for which these duties were appointed. Such penalties are therefore inflicted as it was thought would prevent smuggling.

Many laws have been made with this view. If any goods be shipped or landed without warrant and presence of an officer, the vessel shall be forfeited, and the wharfinger shall forfeit 100*l.* and the master or mariner of any ship inward bound shall forfeit the value of the goods: and any carman, porter, or other as-

sisting, shall be committed to gaol, till he find surety for his good behaviour, or until he shall be discharged by the court of Exchequer (13 & 14 C. II. c. 11). If goods be relanded after drawback, the vessel and goods shall be forfeited; and every person concerned therein shall forfeit double the value of the drawback (8 An. c. 13). Goods taken in at sea shall be forfeited, and also the vessel into which they are taken; and every person concerned therein shall forfeit treble value (9 G. II. c. 35). A vessel hovering near the coast shall be forfeited, if under 50 tons burden; and the goods shall also be forfeited, or the value thereof (5 G. III. c. 43). Persons receiving or buying run goods shall forfeit 20*l.* (8 G. c. 18). A concealer of run goods shall forfeit treble value (8 G. c. 18). Offering run goods to sale, the same shall be forfeited, and the person to whom they are offered may seize them; and the person offering them to sale shall forfeit treble value (11 G. c. 30). A porter or other person carrying run goods shall forfeit treble value (9 G. II. c. 35). Persons armed or disguised carrying run goods shall be guilty of felony, and transported for seven years (8 G. c. 18. 9 G. II. c. 35).

But the last statute, 19 G. II. c. 34. is for this purpose *instar omnium*; for it makes all forcible acts of smuggling, carried on in defiance of the laws, or even in disguise to evade them, felony without benefit of clergy: enacting, that if three or more persons shall assemble, with fire-arms or other offensive weapons, to assist in the illegal exportation or importation of goods, or in rescuing the same after seizure, or in rescuing offenders in custody for such offences; or shall pass with such goods in disguise; or shall wound, shoot at, or assault, any officers of the revenue when in the execution of their duty; such persons shall be felons, without the benefit of clergy.

SMU'GLY. *ad.* (from *smug.*) Neatly; sprucely (*Gay*).

SMU'GNESS. *s.* (from *smug.*) Spruceness; neatness without elegance.

SMUT. *s.* (ꝛmitta, Saxon; *smette*, Dut.) 1. A spot made with soot or coal. 2. Must or blackness gathered on corn; mildew (*Mort.*). 3. Obscenity.

To SMUT. *v. a.* (from the noun.) 1. To stain; to mark with soot or coal (*Addison*). 2. To taint with mildew (*Bacon*).

To SMUT. *v. n.* To gather must (*Mortimer*).

To SMUTCH. *v. a.* (from *smut.*) To black with smoke (*Ben Jonson*).

SMU'TTILY. *ad.* (from *smutty.*) 1. Blackly; smokily. 2. Obscenely.

SMU'TTINESS. *s.* (from *smutty.*) 1. Soil from smoke (*Temple*). 2. Obsceneness.

SMU'TTY. *a.* (from *smut.*) 1. Black with smoke or coal (*Swift*). 2. Tainted with mildew (*Locke*). 3. Obscene; not modest (*Collier*).

SMYRNA, a seaport of Asiatic Turkey, in Natolia, and one of the largest and richest cities of the Levant. The goodness of the harbour has caused it to be rebuilt several times, after having been destroyed by earthquakes. It is the rendezvous of merchants from almost all parts of the world, and the magazine of their merchandise. The Turks have 19 mosques, the Greeks two churches, the Jews eight synagogues, the Armenians one church, and the Latins three convents. There are three bishops, one Greek, the other Latin, and the third Armenian. Its population is computed at 120,000 persons. The streets are more open, better paved, and the houses better built, than in other towns of the continent. The street of the Franks is the finest in Smyrna, and lies all along the harbour. It is eight days journey from Constantinople by land, 25 days from Aleppo, by the caravans, six from Cogni, seven from Cataya, and six from Satalia. The imports from England consist of woollen cloths, camlets, lead, tin, and hardware; these are exchanged for cotton, coffee, mohair, drugs, galls, raisins, figs, &c. The English and Dutch factors have protestant chapels, and taverns are as open here as in Europe. The fortifications consist of a fort, a castle, a mountain, and an old citadel. It is seated at the head of a large bay, 190 miles S.S.W. of Constantinople. Lon. 27. 7 E. Lat. 38. 28 N.

SMYRNIUM. Alexanders. In botany, a genus of the class pentandria, order digynia. Fruit oblong, angular-ribbed; petals pointed, carinate, incurved. Seven species, scattered over the Levant, the Cape, and America; one species only, S. olusatrum, common to our own country, and found wild on old walls.

Several of these were cultivated formerly: the last only is cultivated now. It has a biennial, fleshy, branched root, often of a sickly, yellowish cast, succulent, in flavour not unlike that of celery, but more strong and bitter; the flowers are small, numerous, irregular, greenish, yellow; the fruit large, black, remarkably gibbous, deeply grooved.

SNACK. *s.* (from *snatch.*) A share; a part taken by compact (*Dryden*).

To SNA'FFLE. *v. a.* (from the noun.) To bridle; to hold in a bridle; to manage.

SNAFFLE, a well known kind of bridle. The snaffle is a very slender bit-mouth without any branches. They are in very general use. See BRIDLE. The common snaffle, or small watering bit, is only a scatch-mouth, with two very little straight branches, and a curb mounted with a headstall, and two long reins.

SNAG. *s.* (etymology not known.) 1. A jag or sharp protuberance (*Spenser*). 2. A tooth left by itself, or standing beyond the rest; a tooth, in contempt (*Prior*).

SNA'GGED. SNA'GGY. *a.* (from *snag.*) Full of snags; full of sharp protuberances; shooting into sharp points (*More*).

SNAIL, in helminthology. See HELIX.

SNAIL (Naked), in helminthology. See LIMAX.

SNAIL FLOWER, in botany. See PHASEOLUS.

SNAIL PLANT, SNAIL TREFOIL, in botany. See MEDICAGO.

SNAITH, a town in W. Yorkshire, with

a market on Friday, seated near the Aire, 22 miles S. of York, and 175 N. by W. of London.

SNAKE, in amphibiology. See ANGUIS.

SNAKE CUCUMBER, in botany. See CUCUMIS.

SNAKE GOURD, in botany. See TRICOSANTHES.

SNAKE ROOT, in botany. See ARISTOLOCHIA.

SNAKE ROOT (Rattle), in botany. See POLYGALA.

SNAKE-STONE. Serpent-stone: cornu ammonis. A species of petrified nautilus. See HELMINTHOLITHUS.

SNA'KY. *a.* (from *snake.*) 1. Serpentine; belonging to a snake; resembling a snake (*Milton*). 2. Having serpents (*Ben Jonson*).

To SNAP. *v. a.* (the same with *knap.*) 1. To break at once; to break short (*Digby*). 2. To strike with a knacking noise, or sharp sound (*Pope*). 3. To bite (*Wiseman*). 4. To catch suddenly and unexpectedly (*Swift*). 5. To treat with sharp language (*Granville*).

To SNAP. *v. n.* 1. To break short; to fall asunder (*Donne*). 2. To make an effort to bite with eagerness (*Shakspeare*).

SNAP. *s.* (from the verb.) 1. The act of breaking with a quick motion. 2. A greedy fellow (*L'Estrange*). 3. A quick eager bite (*Carew*). 4. A catch; a theft.

SNAP DRAGON, in botany. See ANTIRRHINUM.

SNAP DRAGON, is also a kind of play, in which brandy is set on fire, and raisins thrown into it, which those who are unused to the sport are afraid to take out; but which may be safely snatched by a quick motion, and put blazing into the mouth, which being closed, the fire is at once extinguished.

SNAP TREE, in botany. See JUSTICIA.

SNA'PPER. *s.* One who snaps (*Shaksp.*).

SNA'PPISH. *a.* (from *snap.*) 1. Eager to bite (*Spectator*). 2. Peevish; sharp in reply.

SNA'PPISHLY. *ad.* Peevishly; tartly.

SNA'PPISHNESS. *s.* (from *snappish.*) Peevishness; tartness.

SNA'PSACK. *s.* (*snappsack*, Swedish.) A soldier's bag: more usually *knapsack.*

SNARE. *s.* (*snara*, Swedish and Islandic; *snare*, Danish; *snoor*, Dutch.) 1. Any thing set to catch an animal; a gin; a net; a noose (*Milton*). 2. Any thing by which one is entrapped or entangled (*Taylor*).

To SNARE. *v. a.* (from the noun.) To entrap; to entangle; to catch in a noose (*Milton*).

To SNARL. *v. a.* (*snarren*, Dutch.) 1. To growl as an angry animal; to gnar (*Shaksp.*). 2. To speak roughly; to talk in rude terms (*Congreve*).

To SNARL. *v. a.* To entangle; to embarrass (*Decay of Piety*).

SNA'RLER. *s.* (from *snarl.*) One who snarls; a growling, surly, quarrelsome, insulting fellow (*Swift*).

SNA'RY. *a.* (from *snare.*) Entangling; insidious (*Dryden*).

SNAST. *s.* The snuff of a candle (*Bacon*).

To SNATCH. *v. a.* (*snacken*, Dutch.) 1. To seize any thing hastily (*Hooker*). 2. To transport or carry suddenly (*Clarendon*).

To SNATCH. *v. n.* To bite or catch eagerly at something (*Shakspeare*).

SNATCH. *s.* (from the verb.) 1. A hasty catch. 2. A short fit of vigorous action (*Tus.*). 3. A small part of any thing; a broken part (*Brown*). 4. A broken or interrupted action; a short fit (*Wilkins*). 5. A quip; a shuffling answer (*Shakspeare*).

SNA'TCHER. *s.* One that snatches or takes any thing in haste (*Shakspeare*).

SNA'TCHINGLY. *ad.* (from *snatching.*) Hastily; with interruption.

To SNEAK. *v. n.* (snican, Sax. *snige*, Dan.) 1. To creep slily; to come or go as if afraid to be seen (*Watts*). 2. To behave with meanness and servility; to crouch; to truckle (*Pope*).

SNE'AKER. *s.* A small vessel of drink (*Spectator*).

SNE'AKING. *participial. a.* (from *sneak.*) 1. Servile; mean; low (*Rowe*). 2. Covetous; niggardly; meanly parsimonious.

SNE'AKINGLY. *ad.* (from *sneaking.*) 1. Meanly; servilely (*Herbert*). 2. In a covetous manner.

SNEA'KINGNESS. *s.* (from *sneaking.*) 1. Niggardliness. 2. Meanness; pitifulness.

SNE'AKUP. *s.* (from *sneak.*) A cowardly, creeping, insidious scoundrel (*Shakspeare*).

To SNEAP. *v. a.* 1. To reprimand; to check. 2. To nip (*Shakspeare*).

SNEAP. *s.* A reprimand; a check (*Shakspeare*).

To SNEB. *v. a.* (properly to *snib.*) To check; to chide; to reprimand (*Spenser*).

To SNEER. *v. n.* 1. To show contempt by looks. 2. To insinuate contempt by covert expressions (*Pope*). 3. To utter with grimace (*Congreve*). 4. To show awkward mirth (*Taylor*).

SNEER. *s.* (from the verb). 1. A look of contemptuous ridicule (*Pope*). 2. An expression of ludicrous scorn (*Watts*).

SNE'ERER. *s.* He that sneers.

To SNEEZE. *v. n.* (nieran, Saxon; *niesen*, Dutch.) To emit wind audibly by the nose (*Wiseman*).

SNEEZE. *s.* (from the verb.) Emission of wind audibly by the nose (*Brown*).

SNEEZE WORT, in botany. See ACHILLEA.

SNEEZING, a convulsive motion of the muscles of the breast whereby the air is expelled from the nose with much vehemence and noise. It is caused by the irritation of the upper membrane of the nose, occasioned by acrid substances floating in the air, or by medicines called sternutatory.

The irritation is performed either externally, by strong smells, as marjoram, roses, &c. or by dust floating in the air, and taken in by inspiration; or by sharp pungent medicines, as cresses and other sternutatories, which vellicate the membrane of the nose; or internally, by the acri-

mony of the lympha or mucus, which naturally moistens that membrane. The matters cast forth in sneezing come primarily from the nose and throat, the pituitary membrane continually exuding a mucus thither; and, secondarily, from the breast, the trachea, and the bronchia of the lungs.

The practice of saluting the person who sneezed existed in Africa, among nations unknown to the Greeks and Romans. The accounts we have of Monomotapa inform us, that when the prince sneezes, all his subjects in the capital are advertised of it, that they may offer up prayers for his safety. The author of the Conquest of Peru assures us, that the cacique of Guachoia having sneezed in presence of the Spaniards, the Indians of his train fell prostrate before him, stretched forth their hands, and displayed to him the accustomed marks of respect, while they invoked the sun to enlighten him, to defend him, and to be his constant guard.

SNELL (Rodolph), an eminent Dutch philosopher, was born at Oudewater, in 1546. He was some time professor of Hebrew and mathematics at Leyden, where he died in 1613. He was author of several works on geometry, and on all parts of the philosophy of his time.

SNELL (Willebrord), son of the preceding, was born at Leyden in 1591, and succeeded his father in the mathematical professorship in 1613. He died in 1626. He was the first who discovered the true law of the refraction of the rays of light. His works are numerous and respectable, the chief of which is entitled Cyclometricus de Circuli Dimensione, &c. 4to. 1621. In this treatise he gives several ingenious approximations to the measure of the circle, both arithmetical and geometrical.

SNET. *s.* (among hunters.) The fat of a deer.

SNEW. The old preterit of *To snow*.

To SNIB. *v. a.* (*snibbe*, Danish.) To check; to nip; to reprimand (*Spenser*).

SNICK *and snee. s.* A combat with knives (*Wiseman*).

To SNI'CKER or SNIGGER. *v. n.* To laugh slily, wantonly, or contemptuously; to laugh in one's sleeve.

To SNIFF. *v. n.* (*snissa*, Swedish.) To draw breath audibly up the nose (*Swift*).

To SNI'GGLE. *v. n. Sniggling* is thus performed: take a strong small hook, tied to a string about a yard long; and then into the hole where an eel may hide himself, with a short stick put your bait leisurely; if within the sight of it, the eel will bite; pull him out by degrees (*Walton*).

To SNIP. *v. a.* (*snippen*, Dutch.) To cut at once with scissors (*Arbuthnot*).

SNIP. *s.* (from the verb.) 1. A single cut with scissors (*Sh.*). 2. A small shred (*Wiseman*). 3. A share; a snack (*L'Estrange*).

SNIPE, in ornithology. See SCOLOPAX.

SNIPES are well known to the sporting world in winter shooting, and are of two sorts; one nearly as large again as the other, though precisely the same in shape, make, and feather. They frequent the same places, subsist on the same food, and are frequently found near each other. The larger is called a *whole snipe*; the smaller a *jack*; the latter is not very easily killed, at least by an indifferent shot. They are birds of passage, supposed to breed principally in the lower lands of Switzerland and Germany, though some (particularly the jacks) remain and breed in the fens and marshy swamps of this country, where their nests with eggs and young are frequently found. They arrive here sooner or later in the autumn, regulated in respect to time by the wind and weather, but never appear till after the first rains; and leave this country in the spring, as soon as the warmer sun begins to absorb the moisture from the earth, and denote the approach of summer.

SNI'PPER. *s.* (from *snip.*) One that snips.

SNI'PPET. *s.* (from *snip.*) A small part; a share (*Hudibras*).

SNI'PSNAP. *s.* Tart dialogue (*Pope*).

SNITE. *s.* (ꝛnıta, Saxon.) A snipe (*Carew*).

To SNITE. *v. a.* (ꝛnýtan, Saxon.) To blow the nose (*Grew*).

SNI'VEL. *s.* (*snevel*, German.) Snot; the running of the nose.

To SNI'VEL. *v. n.* (from the noun.) 1. To run at the nose. 2. To cry as children (*L'Estrange*).

SNI'VELLER. *s.* (from *snivel.*) A weeper; a weak lamenter (*Swift*).

To SNORE. *v. n.* (*snorcken*, Dutch.) To breathe hard through the nose, as men in sleep (*Stillingfleet*).

SNORE. *s.* (ꝛnopa, Saxon.) Audible respiration of sleepers through the nose (*Shakspeare*).

SNO'RER. *s.* He that snores.

To SNORT. *v. n.* (*snorcken*, Dutch.) To blow through the nose as a high-mettled horse (*Jeremiah*).

SNOT. *s.* (ꝛnote, Saxon; *snot*, Dutch.) The mucus of the nose (*Swift*).

SNO'TTY. *a.* (from *snot.*) Full of snot.

SNOUT. *s.* (*snuyt*, Dutch.) 1. The nose of a beast (*Dryden*). 2. The nose of a man, in contempt (*Swift*). 3. The nosel or end of any hollow pipe.

SNO'UTED. *a.* Having a snout (*Grew*).

SNOW, a well-known substance, formed by the freezing of the vapours in the atmosphere. It differs from hail and hoar-frost, in being as it were crystallized, which they are not. This appears on examining a flake of snow by a magnifying glass; when the whole of it will appear to be composed of fine shining spicula, diverging like rays from a centre. As the flakes fall down through the atmosphere, they are continually joined by more of these radiated spicula, and thus increase in bulk like the drops of rain or hail-stones. Dr. Grew, in a discourse of the nature of snow, observes, that many parts thereof are of a regular figure, for the most part stars of six points, and are as perfect and transparent ice as any we see on a pond, &c. Upon each of these points are other collateral points, set at the same angles as the main points themselves; among which

there are divers other irregular, which are chiefly broken points, and fragments of the regular ones. Others also, by various winds, seemed to have been thawed, and frozen again into irregular clusters; so that it seems as if the whole body of snow were an infinite mass of icicles irregularly figured: that is, a cloud of vapours being gathered into drops, the said drops forthwith descend; upon which descent, meeting with a freezing air as they pass through a colder region, each drop is immediately frozen into an icicle, shooting itself forth into several points; but these still continuing their descent, and meeting with some intermitting gales of warmer air, or in their continual waftage to and fro touching upon each other, some of them are a little thawed, blunted, and again frozen into clusters, or entangled so as to fall down into what we call flakes. The lightness of snow, although it is firm ice, is owing to the excess of its surface in comparison to the matter contained under it: as gold itself may be extended in surface till it will ride upon the least breath of air. The whiteness of snow is owing to the small particles into which it is divided; for ice, when pounded, will become equally white. According to Beccaria, clouds of snow differ in nothing from clouds of rain, but in the circumstance of cold that freezes them. Both the regular diffusion of the snow, and the regularity of the structure of its parts, (particularly of some figures of snow or hail which fall about Turin, and which he calls *rosette*), show that clouds of snow are acted upon by some uniform cause like electricity; and he endeavours to show how electricity is capable of forming these figures. He was confirmed in his conjectures by observing, that his apparatus for observing the electricity of the atmosphere never failed to be electrified by snow as well as rain. Professor Winthrop sometimes found his apparatus electrified by snow when driven about by the wind, though it had not been affected by it when the snow itself was falling. A more intense electricity, according to Beccaria, unites the particles of hail more closely than the more moderate electricity does those of snow, in the same manner as we see, that the drops of rain which fall from thunder clouds are larger than those which fall from others, though the former descend through a less space.

Were we to judge from appearances only, we might imagine, that so far from being useful to the earth, the cold humidity of snow would be detrimental to vegetation. But the experience of all ages asserts the contrary. Snow, particularly in those northern regions where the ground is covered with it for several months, fructifies the earth, by guarding the corn or other vegetables from the intenser cold of the air, and especially from the cold piercing winds. It has been a vulgar opinion, very generally received, that snow fertilizes the land on which it falls more than rain, in consequence of the nitrous salts, which it is supposed to acquire by freezing. But it appears from the experiments of Margraaf, in the year 1731, that the chemical difference between rain and snow water is exceedingly small; that the latter is somewhat less nitrous, and contains a somewhat less proportion of earth than the former; but neither of them contain either earth, or any kind of salt, in any quantity which can be sensibly efficacious in promoting vegetation. Allowing, therefore, that nitre is a fertilizer of land, which many are upon good grounds disposed utterly to deny, yet so very small is the quantity of it contained in snow, that it cannot be supposed to promote the vegetation of plants upon which the snow has fallen. The peculiar agency of snow, as a fertilizer in preference to rain, may admit of a very rational explanation, without recurring to nitrous salts, supposed to be contained in it. It may be ascribed to its furnishing a covering to the roots of vegetables, by which they are guarded from the influence of the atmospherical cold, and the internal heat of the earth is prevented from escaping. The internal parts of the earth are heated uniformly to the forty-eighth degree of Fahrenheit's thermometer. This degree of heat is greater than that in which the watery juices of vegetables freeze, and it is propagated from the inward parts of the earth to the surface, on which the vegetables grow. The atmosphere being variably heated by the action of the sun in different climates, and in the same climate at different seasons, communicates to the surface of the earth, and to some distance below it, the degree of heat or cold which prevails in itself. Different vegetables are able to preserve life under different degrees of cold, but all of them perish when the cold which reaches their roots is extreme. Providence has, therefore, in the coldest climates, provided a covering of snow for the roots of vegetables, by which they are protected from the influence of the atmospherical cold. The snow keeps in the internal heat of the earth, which surrounds the roots of vegetables, and defends them from the cold of the atmosphere.

SNOW, in naval affairs, a vessel equipped with two masts resembling the main and foremasts of a ship, and a third small mast just abaft the main-mast, carrying a sail nearly similar to a ship's mizen; the foot of this mast is fixed in a block of wood, upon deck, and the lead is attached to the after part of the main top. The sail is called a try-sail, and hence the mast is termed a try-sail-mast.

To SNOW. *v. n.* (snapan, Saxon; *sneuwen*, Dutch.) To fall in snow (*Brown*).

To SNOW. *v. a.* To scatter like snow (*Donne*).

SNOWBALL. *s.* (*snow* and *ball.*) A round lump of congealed snow (*Hayward*).

SNOWBALL TREE. See VIBURNUM.

SNOWBROTH, a name sometimes given to any cold liquor.

SNOWBERRY TREE. See CHIOCOCCA.

SNOWDON, a famous mountain in Carnarvonshire. Its name signifies literally, the Hill of Snow, from snow and down. Eryri, the Welsh name, is from Mynyd Eryrod, the

blending them more intimately together. When cloths and serges first proceed from the hands of the weaver, they are loose and coarse, and in this state would be but of little value or duration But by intermingling and amalgamating the web of the chain with that of the woof, the artist renders both finer and stronger. This operation of fulling, as just observed, was chiefly produced by the action of the hands or feet; by rubbing with the former or trampling with the latter, and is significantly expressed by the Greek terms πατειν, συμπατεισθαι, and by Nonius, *argutari pedibus*. Rollers were, nevertheless, occasionally employed in this branch of the business, as well for beating as for pressing the cloth; and Cato, among other utensils with which a farm-house ought to be stocked, enumerates, in consequence, the *pilæ fullonicæ*, or fuller's beams or rollers, which, he expressly tells us, were formed of wood."

We shall now proceed to describe the different kinds of soap obtained in the present day, as dependent upon the employment of alkalies, earths, or metallic oxyds.

ALKALINE SOAPS.

As there are a great number of fixed oils, all or most of which are capable of combining with alkalies, earths, and oxyds, it is natural to suppose that there are as many genera of alkaline soaps as there are oils. That there are differences in the nature of soaps corresponding to the oil which enters into their composition, is certain; but these differences are not of sufficient importance to require a particular description. It will be sufficient, therefore, to divide the alkaline soaps into as many species as there are alkalies, and to consider those soaps which have the same alkaline base, but differ in their oil, as varieties of the same species.

Soap of soda, or hard soap.—This soap may be prepared by the following process: a quantity of the soda of commerce is pounded, and mixed in a wooden vessel, with about a fifth part of its weight of lime, which has been slacked and passed through a sieve immediately before. Upon this mixture a quantity of water is poured, considerably more than what is sufficient to cover it, and allowed to remain on it for several hours. The lime attracts the carbonic acid from the soda, and the water becomes strongly impregnated with the pure alkali, which in that state is caustic. This water is then drawn off by means of a stop-cock, and called the first ley. Its specific gravity should be about 1.200.

Another quantity of water is then to be poured upon the soda, which, after standing two or three hours, is also to be drawn off by means of the stop-cock, and called the second ley.

Another portion of water is poured on; and after standing a sufficient time, is drawn off like the other two, and called the third ley.

Another portion of water may still be poured on, in order to be certain that the whole of the soda is dissolved; and this weak ley may be put aside, and employed afterwards in forming the first ley in subsequent operations.

A quantity of oil, equal to six times the weight of the soda used, is then to be put into the boiler, together with a portion of the third or weakest ley; and the mixture must be kept boiling and agitated constantly by means of a wooden instrument. The whole of the third ley is to be added at intervals to the mixture; and after it is consumed, the second ley must be added in the same manner. The oil becomes milky, combines with the alkali, and after some hours it begins to acquire consistence. A little of the first ley is then to be added, not forgetting to agitate the mixture constantly. Portions of the first ley are to be added at intervals; the soapy substance acquires gradually greater consistency, and at last it begins to separate from the watery part of the mixture. A quantity of common salt is then to be added, which renders the separation much more complete. The boiling is to be continued still for two hours, and then the fire must be withdrawn, and the liquor must be no longer agitated. After some hours repose, the soap separates completely from the watery part, and swims upon the surface of the liquor. The watery part is then to be drawn off; and as it contains a quantity of carbonat of soda, it ought to be reserved for future use.

The fire is then to be kindled again; and, in order to facilitate the melting of the soap, a little water, or rather weak ley, is to be added to it. As soon as it boils, the remainder of the first ley is to be added to it at intervals. When the soap has been brought to the proper consistence, which is judged of by taking out small portions of it and allowing it to cool, it is to be withdrawn from the fire, and the watery part separated from it as before. It is then to be heated again, and a little water mixed with it, that it may form a proper paste. After this let it be poured into the vessels proper for cooling it; in the bottom of which there ought to be a litle chalk in powder, to prevent the soap from adhering. In a few days the soap will have acquired sufficient consistence to be taken out, and formed into proper cakes.

The use of the common salt in the above process is, to separate the water from the soap; for common salt has a stronger affinity for water than soap has.

Olive-oil has been found to answer best for making soap, and next to it perhaps tallow may be placed; but a great variety of other oils may be employed for that purpose, as appears from the experiments of the French chemists. They found, however, that linseed-oil and whale-oil were not proper for making hard soaps, though they might be employed with advantage in the manufacture of soft soaps. Whale-oil has been long used by the Dutch for this last purpose.

Soap may also be made without the assistance of heat; but in that case a much longer time and a larger proportion of alkali are necessary.

Manufacturers have contrived various methods of sophisticating soap, or of adding ingredients which increase its weight without increasing its value. The most common substance used for that purpose is water; which may be added in considerable quantities, especially to soap made with tallow (the ingredient used in this country), without diminishing its consistency. This fraud may be easily detected, by allowing the soap to lie for some time exposed to the air. The water will evaporate from it, and its quantity will be discovered by the diminution of the weight of the soap. As soap sophisticated in this manner would lose its water by being kept, manufacturers, in order to prevent that, keep their soap in saturated solutions of common salt; which do not dissolve the soap, and at the same time, by preventing all evaporation, preserve, or rather increase the weight of the soap. Messrs. Darcet, Lelievre, and Pelletier, took two pieces equal in weight of soap sophisticated in this manner, and placed the one in a dry place in the open air, and the other in a saturated solution of common salt. After a month the first had lost 0.56 of its weight, the other had gained about 0.10 parts. Various other methods have been fallen upon to sophisticate soap; but as they are not generally known, it would be doing an injury to the public to describe them here.

From the experiments of Darcet, Lelievre, and Pelletier, it appears that soap newly made and exposed to sale contains

60.94 oil
8.56 alkali
30.50 water

100.00

Soap is soluble both in water and in alcohol. Its properties as a detergent are too well known to require any description.

Soap made with tallow and soda has a white colour, and is therefore known by the name of white soap; but it is usual for soap-makers, in order to lower the price of the article, to mix a considerable portion of rosin with the tallow; this mixture forms the common yellow or turpentine soap of this country.

Soap of potass, or soft soap.—Potass may be substituted for soda in making soap, and in that case precisely the same process is to be followed. It is remarkable, that when potass is used, the soap does not assume a solid form; its consistence is never greater than that of hog's lard. This is what in this country is called soft soap. Its properties as a detergent do not differ materially from those of hard soap, but it is not nearly so convenient for use. The alkali employed by the ancient Gauls and Germans in the formation of soap was potass; hence we see the reason that it is described by the Romans as an unguent. The oil employed for making soft soap in this country is whale-oil. A little tallow is also added, which, by peculiar management, is dispersed through the soap in fine white spots.

Some persons have affirmed that they knew a method of making hard soap with potass. Their method is this: After forming the soap in the manner above described, they add to it a large quantity of common salt, boil it for some time, and the soap becomes solid when cooled in the usual way. That this method may be practised with success, has been ascertained by Messrs. Darcet, Lelievre, and Pelletier; but then the hard soap thus formed does not contain potass but soda; for when the common salt (muriat of soda) is added, the potass of the soap decomposes it, and combines with its muriatic acid, while at the same time the soda of the salt combines with the oil, and forms hard soap; and the muriat of potass formed by this double decomposition is dissolved in water, and drawn off along with it.

Chaptal has lately proposed to substitute wool in place of oil in the making of soap. The ley is formed in the usual manner, and made boiling hot, and shreds of woollen cloth of any kind are gradually thrown into it; they are soon dissolved. New portions are to be added sparingly, and the mixture is to be constantly agitated. When no more cloth can be dissolved, the soap is made. This soap is said to have been tried with success. It might doubtless be substituted for soap with advantage in several manufactures, provided it can be obtained at a cheaper rate than the soaps at present employed.

Some time ago a proposal was made to substitute the muscles of fish instead of tallow or oil in the manufacture of soap; but the experiments of Mr. Jamieson have demonstrated that they do not answer the purpose.

Soap of ammonia.—This soap was first particularly attended to by Mr. Berthollet. It may be formed by pouring carbonat of ammonia on soap of lime. A double decomposition takes place, and the soap of ammonia swims upon the surface of the liquor in the form of an oil; or it may be formed with still greater ease by pouring a solution of muriat of ammonia into common soap dissolved in water.

It has a more pungent taste than common soap. Water dissolves a very small quantity of it; but it is easily dissolved in alcohol. When exposed to the air it is gradually decomposed. The substance called volatile liniment, which is employed as an external application in rheumatisms, colds, &c. may be considered as scarcely any thing else than this soap.

All the alkaline soaps agree in the properties of solubility in water and alcohol, and in being powerful detergents.

EARTHY SOAPS.

The earthy soaps differ essentially from the alkaline in their properties. They are insoluble in water, and incapable of being employed as detergents. They may be formed very readily by mixing common soap with a solution of an earthy salt; the alkali of the soap combines with the acid of the salt, while the earth and oil unite together and form an earthy soap. Hence the reason that all waters holding an earthy salt are unfit for washing. They

decompose common soap, and form an earthy soap insoluble in water. These waters are well known by the name of hard waters. Hitherto the earthy soaps have been examined by Mr. Berthollet only.

Soap of lime.—This soap may be formed by pouring lime-water into a solution of common soap. It is insoluble both in water and alcohol. Carbonat of fixed alkali decomposes it by compound affinity. It melts with difficulty, and requires a strong heat.

Soap of barytes and of strontian resemble almost exactly the soap of lime.

Soap of magnesia may be formed by mixing together solution of common soap and sulphat of magnesia. It is exceedingly white. It is unctuous, dries with difficulty, and preserves its whiteness after desiccation. It is insoluble in boiling water. Alcohol and fixed oil dissolve it in considerable quantity. Water renders its solution in alcohol milky. A moderate heat melts it; a transparent mass is formed, slightly yellow, and very brittle.

Soap of alumina may be formed by mixing together solutions of alum and of common soap. It is a flexible soft substance, which retains its suppleness and tenacity when dry. It is insoluble in alcohol, water, and oil. Heat easily melts it, and reduces it to a beautiful transparent yellowish mass.

METALLIC SOAPS.

These soaps have been examined by Mr. Berthollet, who has proposed some of them as paints, and others as varnishes; but it does not appear that any of them has been hitherto applied to these purposes.

1. Soap of mercury may be formed by mixing together a solution of common soap and of corrosive muriat of mercury. The liquor becomes milky, and the soap of mercury is gradually precipitated. This soap is viscid, not easily dried, loses its white colour when exposed to the air, and acquires a slate-colour, which gradually becomes deeper, especially if exposed to the sun or to heat. It dissolves very well in oil, but sparingly in alcohol. It readily becomes soft and fluid when heated.

2. Soap of zinc may be formed by mixing together a solution of sulphat of zinc and of soap. It is of a white colour, inclining to yellow. It dries speedily, and becomes friable.

3. Soap of cobalt, made by mixing nitrat of cobalt and common soap, is of a dull leaden colour, and dries with difficulty, though its parts are not conducted.

Mr. Berthollet observed, that towards the end of the precipitation there fell down some green coagula, much more consistent than soap of cobalt. These he supposed to be a soap of nickel, which is generally mixed with cobalt.

4. Soap of tin may be formed by mixing common soap with a solution of tin in nitro-muriatic acid. It is white. Heat does not fuse it like other metallic soaps, but decomposes it.

5. Soap of iron may be formed by means of sulphat of iron. It is of a reddish-brown colour, tenacious, and easily fusible. When spread upon wool, it sinks in and dries. It is easily soluble in oil, especially of turpentine. Berthollet proposes it as a varnish.

6. Soap of copper may be formed by means of sulphat of copper. It is of a green colour, has the feel of a resin, and becomes dry and brittle. Hot alcohol renders its colour deeper, but scarcely dissolves it. Ether dissolves it, liquefies it, and renders its colour deeper and more beautiful. It is very soluble in oils, and gives them a pleasant green colour.

7. Soap of lead may be formed by means of acetite of lead. It is white, tenacious, and very adhesive when heated. When fused it is transparent, and becomes somewhat yellow if the heat is increased.

8. Soap of silver may be formed by means of nitrat of silver. It is at first white, but becomes reddish by exposure to the air. When fused, its surface becomes covered with a brilliant iris; beneath the surface it is black.

9. Soap of gold is formed by means of muriat of gold. It is at first white, and of the consistence of cream. It gradually assumes a dirty purple colour, and adheres to the skin.

10. Soap of manganese is formed of sulphat of manganese. It is at first white, and then by absorbing oxygen it becomes red.

Besides these we have also to notice soaps made with essential oils, and known under the name of Starkey's soap, this being the alchemist who first invented it. The combination of the essential oils with the fixed alkalies is much more difficult than that of the expressed oils and fats, and much less perfect, so that a separation is likely to take place, whatever pains be taken in the mixture. Starkey's process was tedious and uncertain. It consisted in putting in a vessel some dry carbonat of potash with oil of turpentine, and shaking the mixture daily for six months, during which time part of the oil combines with the alkali into a saponaceous mass, and the remainder floats above it unaltered. Beaumé has taken a good deal of pains to find out the best method of making this mixture. His method is the following. Put in a marble mortar or a porphyry stone any dry quantity of carbonat of potash, add to it gradually twice or thrice its weight of oil of turpentine, and rub them together till the mixture has the consistence of a soft extract; then put it into a glass cucurbit, and set it at rest in a damp place, during which the mixture absorbs much moisture from the air, and resolves itself into three portions, the lowest of which is a watery solution of the alkali, the middle is the soap required, and the upper portion is some uncombined oil of turpentine, generally yellow or amber coloured. Pour the whole on a strainer of double cloth, and the soap alone remains on the strainer, which after draining for some days, must be again rubbed in a mortar, and is then complete. The alkaline liquor that runs through the filter is somewhat impregnated with the oil.

SOAP-BERRY TREE. See SAPINDUS.

SOAP-WORT (Common). See SAPONARIA.
SOAP-WORT (American). See RHEXIA.
SOAPBOI'LER. *s.* (*soap* and *boil.*) One whose trade is to make soap (*Addison*).
To SOAR. *v. n.* (*sorare*, Italian.) 1. To fly aloft; to tower; to mount; properly to fly without visible action of the wings (*Shaks.*). 2. To mount intellectually; to tower with the mind (*Addison*). 3. To rise high (*Milton*).
SOAR. *s.* (from the verb.) Towering flight.
To SOB. *v. n.* (reob, complaining, Saxon.) To heave audibly with convulsive sorrow; to sigh with convulsion (*Fairfax*).
SOB. *s.* (from the verb.) A convulsive sigh; a convulsive act of respiration obstructed by sorrow (*Swift*).
To SOB. *v. a.* To soak. A cant word.
SO'BER. *a.* (*sobrius*, Latin; *sobre*, Fr.) 1. Temperate; particularly in liquors; not drunken (*Taylor*). 2. Not overpowered by drink (*Hooker*). 3. Not mad; right in the understanding (*Dryden*). 4. Regularly; calm; free from inordinate passion (*Abbot*). 5. Serious; solemn; grave (*Shakspeare*).
To SO'BER. *v. a.* (from the adjective.) To make sober; to cure of intoxication (*Pope*).
SO'BERLY. *ad.* (from *sober.*) 1. Without intemperance. 2. Without madness. 3. Temperately; moderately (*Bacon*). 4. Cooly; calmly.
SO'BERNESS. *s.* (from *sober.*) 1. Temperance in drink (*Com. Prayer*). 2. Calmness; freedom from enthusiasm; coolness.
SOBRI'ETY. *s.* (*sobrieté*, French; *sobrius*, Latin.) 1. Temperance in drink; soberness (*Taylor*). 2. Present freedom from the power of strong liquor. 3. General temperance (*Hooker*). 4. Freedom from inordinate passion (*Rogers*). 5. Calmness; coolness (*Dryden*). 6. Seriousness; gravity (*Denham*).
SO'CCAGE. *s.* (*soc*, French, a ploughshare; *soccagium*, barbarous Latin.) A tenure of lands for certain inferior or husbandry services to be performed to the lord of the fee. All services due for land being knight's service, or *soccage*; so that whatever is not knight's service, is *soccage* (*Cowell*).
SO'CCAGER. *s.* (from *soccage.*) A tenant by soccage.
SO'CIABLE. *a.* (*sociable*, French; *sociabilis*, Latin.) 1. Fit to be conjoined (*Hooker*). 2. Ready to unite in a general interest (*Addison*). 3. Friendly; familiar; conversable (*Milton*). 4. Inclined to company (*Wotton*).
SO'CIABLENESS. *s.* (from *sociable.*) 1. Inclination to company and converse (*More*). 2. Freedom of conversation; good fellowship.
SO'CIABLY. *ad.* (from *sociable.*) Conversably, as a companion (*Milton*).
SO'CIAL. *a.* (*socialis*, Latin.) 1. Relating to general or public interest; relating to society (*Locke*). 2. Easy to mix in friendly gayety; companionable (*Pope*). 2. Consisting in union or converse with another (*Milton*).
SO'CIALNESS. *s.* (from *social.*) The quality of being social.
SOCI'ETY. *s.* (*societé*, French; *societas*, Latin.) 1. Union of many in one general interest. 2. Numbers united in one interest; community (*Tillotson*). 3. Company; converse (*Shakspeare*). 4. Partnership; union on equal terms (*Dryden*).

SOCIETIES, associations voluntarily formed by a number of individuals for promoting knowledge, industry, or virtue. They may therefore be divided into three classes; societies for promoting science and literature, societies for encouraging and promoting arts and manufactures, and societies for diffusing religion and morality, and relieving distress. Societies belonging to the first class extend their attention to all the sciences and literature in general, or devote it to one particular science. The same observation may be applied to those which are instituted for improving arts and manufactures. Those of the third class are established, either with a view to prevent crimes, as the Philanthropic; Society for diffusion of the Christian religion among unenlightened nations, as the Society for the Propagation of the Gospel in foreign Parts; or for introducing arts and civilization, along with a knowledge of the Christian religion, as the Sierra Leona Company.

The honour of planning and instituting societies for those valuable purposes is due to modern times. A literary association is said to have been formed in the reign of Charlemagne, but the plan seems to have been rude and defective. Several others were instituted in Italy in the 16th century; but from the accounts which we have seen of them, they seem to have been far inferior to those which are most flourishing at present. The most enlarged idea of literary societies seems to have originated with the great lord Bacon, the father of modern philosophy, who recommended to the reigning prince to institute societies of learned men, who should give to the world from time to time a regular account of their researches and discoveries. It was the idea of this great philosopher, that the learned world should be united, as it were, into one immense republic; which, though consisting of many detached states, should hold a strict union and preserve a mutual intelligence with each other, in every thing that regards the common interest. The want of this union and intelligence he laments as one of the chief obstacles to the advancement of science; and, justly considering the institution of public societies, in the different countries of Europe, under the auspices of the sovereign, to be the best remedy for that defect, he has given, in his fanciful work, the New Atalantis, the delineation of a philosophical society on the most extended plan, for the improvement of all arts and sciences; a work which, though written in the language, and tinctured with the coloring of romance, is full of the noblest philosophic views. The plan of lord Bacon, which met with little attention from the age in which he lived, was destined to produce its effect in a period not very distant. The scheme of a philosophical college by Cowley is acknowledged to have had a powerful influence in procuring the establishment of the Royal Society of London by charter from Charles II.; and Cowley's plan is manifestly copied in almost all its parts from that in the New Atalantis. The institution of the Royal Society of London was soon followed by the establishment of the Royal Academy of Sciences at Paris; and these two have served as models to the philosophical academies of the best reputation in the other kingdoms of Europe.

Royal Society of London. See ROYAL.

American Philosophical Society, was established at Philadelphia in the year 1769, for promoting useful knowledge, under the direction of a patron,

a president, three vice-presidents, a treasurer, four secretaries, and three curators. The first volume of their transactions comprehends a period of two years, viz. from Jan. 1, 1769, to Jan. 1, 1771. Their labours seem to have been interrupted during the troubles in America, which commenced soon after; but since their termination, some more volumes have been published, containing a number of very ingenious and useful memoirs.

American Academy of Arts and Sciences, was established by a law of the commonwealth of Massachusetts in North America, in the year 1780.

Boston Academy of Arts and Sciences. This is a society similar to the former, which has lately been established at Boston in New England, under the title of the Academy of Arts and Sciences, &c.

Berlin Society. The Society of Natural Historians at Berlin was founded by Dr. Martini. There is also a Philosophical Society in the same place.

Brussels Society. The Imperial and Royal Academy of Sciences and Belles Lettres of Brussels was founded in 1773. Several volumes of their transactions have now been published.

Dublin Society. This is an Experimental Society, for promoting natural knowledge, which was instituted in 1777: the members meet once a week, and distribute three honorary gold medals annually for the most approved discovery, invention, or essay, on any mathematical or philosophical subject. The society is under the direction of a president, two vice-presidents, and a secretary.

Edinburgh Philosophical Society, succeeded the Medical Society, and was formed upon the plan of including all the different branches of natural knowledge and the antiquities of Scotland. The meetings of this society, interrupted in 1745, were revived in 1752; and in 1754 the first volume of their collection was published, under the title of Essays or Observations Physical and Literary, which has been succeeded by other volumes. This society has been lately incorporated by royal charter, under the name of the Royal Society of Scotland, instituted for the advancement of learning and useful knowledge. The members are divided into two classes, physical and literary; and those who are near enough to Edinburgh to attend the meetings pay a guinea on admission, and the same sum annually. The first meeting was held on the first Monday of August, 1783; when there were chosen, a president, two vice-presidents, a secretary, treasurer, and a council of 12 persons. Seven of the volumes of their Transactions have been published, which are very respectable both for their magnitude and contents.

In France there have been several institutions of this kind for the improvement of science, besides those described under the word *Academy*: as, the Royal Academy at Soissons, founded in 1674: at Villefranche, Beaujolois, in 1679; at Nismes, in 1682; at Angers, in 1685; the Royal Society at Montpelier, in 1706, which is so intimately connected with the Royal Academy of Sciences of Paris, as to form with it, in some respects, one body; the literary productions of this society are published in the memoirs of the academy: the Royal Academy of Sciences and Belles Lettres at Lyons, 1700; at Bourdeaux, in 1703; at Marseilles, in 1726; at Rochelle, in 7134; at Dijon, in 1740; at Pau, in Bern, in 1721; at Beziers, in 1723; at Montauban, in 1744; at Rouen, in 1744; at Amiens, in 1750; at Toulouse, in 1750; at Besançon, in 1752; at Metz, in 1760; at Arras, in 1773; and at Chalons sur Maine, in 1775.

Manchester Literary and Philosophical Society, is of considerable reputation, and has been lately established there, under the direction of two presidents, four vice-presidents, and two secretaries. The number of members is limited to 50; besides these there are several honorary members, all of whom are elected by ballot; and the officers are chosen annually in April. Several valuable essays have been already read at the meetings of this society, and published.

Newcastle-upon-Tyne Literary and Philosophical Society. This society was instituted the 7th of February 1793, under the direction of a president, four vice-presidents, two secretaries, a treasurer, which together with four of the ordinary members form a committee, all annually elected at a general meeting. The subjects proposed for the consideration and improvement of this society comprehend the mathematics, natural philosophy, and history, chemistry, polite literature, antiquities, civil history, biography, questions of general law and policy, commerce, and the arts. From such ample scope in the objects of the society, with the known respectability, zeal, and talents of the members, the greatest improvements and discoveries may be expected to be made in those important branches of useful knowledge.

Medical Society. To this class belong several societies, the principal of which in our own country are the following; viz. the Medical Society of London, instituted in the year 1752, on the plan recommended by lord Bacon (De Augm. Scient. lib. iv. cap. 2.), to revive the Hippocratic method of composing narratives of particular cases, in which the nature of the disease, the manner of treating it, and the consequences, are to be specified; to attempt the cure of those diseases, which, in his opinion, have been too boldly pronounced incurable; and lastly, to extend their inquiries after the powers of particular medicines in the cure of particular cases; the collections of this society have been already published, under the title of Medical Observations and Inquiries, in five volumes: Society of Physicians in London, instituted about the year 1764, the members of which, who must be merely licentiates of the College of Physicians, are elected by ballot, and meet once a fortnight, on Wednesday evening, for the purpose of conversing on the prevailing diseases, &c. and dine together once in a quarter: the Medical Society, Crane-court, instituted in 1773, under the direction of a council, consisting of a president, treasurer, librarian, three physicians, three surgeons, three apothecaries, and three secretaries; the members meet once a fortnight, on Tuesday evening, and their council is annually elected in January, when an oration is delivered by one of the members on some medical subject: Society for the Improvement of Medical Knowledge in London, established in 1782, for the purpose of collecting useful essays and observations for publication; the meetings of this society are held once a fortnight, on Tuesday evening, and the members dine together once a quarter; on which occasion candidates for admission are ballotted for; the society is under the direction of a president, treasurer, two secretaries, and a committee for revising and selecting papers for publication, who are elected annually by ballot: the Medical Society of Edinburgh, to which the public are in-

debted for six volumes of curious and useful essays, collected principally by the late Dr. Monro, from June, 1731, to June, 1736; but this society was afterwards united to another, called the Philosophical Society: the Medical Society of Edinburgh, incorporated by royal charter in 1778, under this title; this institution appears to have been coeval with the establishment of a regular school of physic in the university, though none of its records of an earlier date than 1737 are now preserved: the ordinary members of this society are elected by ballot, and three dissentient exclude a candidate; an ordinary member may also be elected an honorary member, who enjoys the privileges of the others, and receives a diploma, but is freed the obligation of attendance, delivering papers in rotation, &c. to which the ordinary members are subject, but in this case the votes must be unanimous: the meetings of this society are held every Saturday evening in their own hall, during the winter season, when papers on medical subjects are delivered by the several members in rotation; and four of these are annually elected to fill the chair in rotation, with the title of annual presidents.

Society of Antiquarians. Though the object of this body is of rather less importance than that of the Royal Society, yet it has obtained a celebrity little inferior, as much has been done by it towards ascertaining the changes which have taken place in the surface of the earth, exclusive of the principal purpose of the association, which is to generate a liking for the study of our national antiquities; so that, in the sequel, genuine history shall be preferred to the superficial information gleaned from monastic writers; this will be still further explained by the preamble of the charter, which asserts that the study of antiquity, and the history of former times, has ever been esteemed highly commendable and useful, not only to improve the minds of men, but also to incite them to virtuous and noble actions, and such as may hereafter render them famous and worthy examples to late posterity.

When we recollect, that from the time of Henry VIII. learning began to be more generally diffused throughout all ranks of people, and that Leland, Stowe, Camden, Dugdale, Speed, Sir Robert Cotton, and many other eminent antiquarians, used every endeavour to rouse their countrymen into a relish for their pursuits, it may be readily supposed, that attempts were made to form a society which might more effectually promote individual views; that such attempts occurred we have sufficient evidence, but that some adverse cause existed to prevent their fruition equal proof exists, in the fact, that the society did not receive the royal sanction till 1751, when George II. granted the infant association a charter of incorporation, dated November 2, in the above year; this instrument declared the monarch to be the founder and patron of the society, which is enabled to receive and hold in perpetuity any antiquities, books, manuscripts, &c. and lands, tenements, and hereditaments, not exceeding the yearly value of one thousand pounds, which the generosity of individuals may prompt them to bestow on the members collectively; or the society may purchase property of the same description, to the same amount, without licence of alienation in mortmain.

The government of the society consists of twenty-one persons, of whom one is constituted the president, and the first so honoured was the celebrated Martin Folkes, Esq. who held that office till the 23d of April, the day appointed for all subsequent elections, which the charter declares shall be annual. The first council under the act of incorporation contained the names of Viscount Fitzwilliam, Lord Willoughby of Parham, James West, Esq. Mr. Gale, Mr. Wray, Dr. Browne Willis, Dr. Rawlinson, and Arries and Vertue, names that reflected honour on the nation, and were well calculated to confirm the credit and stability of the society, which the king ordained should be composed of men of acknowledged abilities, judging from the following excellent criterion of their pretensions, "by how much any person shall be more excelling in the knowledge of the antiquities and history of this and other nations; by how much the more they are desirous to promote the honour, business, and emoluments of this society; and by how much the more eminent they shall be for piety, virtue, integrity, and loyalty; by so much the more fit and worthy shall such person be judged of being elected and admitted into the said society."

Their transactions, as a body, are under the control of an elective director, who superintends the progress of intended works, of which the society have published several quarto volumes under the title Archæologia, illustrated with engravings, three of Vetusta Monumenta, and a very considerable number of separate prints, and particularly of elevations of cathedrals.

The general meetings of the society are held on every Thursday evening between the months of November and July, and immediately before the sitting of the Royal Society, whose apartments are separated by an anti-room, common to both, from those belonging to the antiquarians in Somerset House; in the left wing of which the latter have an excellent library, open to the fellows from ten till four o'clock every day, who have the further privilege of borrowing books for any time not exceeding a month, by a written application at a general meeting, or to the secretary during the recess.

Similar to the proceedings of the Royal Society, all communications must be made to the secretary, who reads those thought to possess sufficient merit, and in the same manner exhibits fragments of antiquity and drawings, all which are heard and examined in profound silence.

Society for the Encouragement of Arts, Manufactures, and Commerce. This institution originated from the truly patriotic views of several worthy members of the community, who were sensible that rewards from a society formed of the noble, the rich, and the learned, were better calculated to produce emulation in every department of the pursuits mentioned in the title of it, than the mere prospect of advantage to be derived from the employment of individuals. The idea seems to have met the approbation of the public, and a very short time elapsed ere sufficient sums of money were procured to set this useful and respectable body in motion: we now find them fixed in a superb mansion, part of the Adelphi Buildings, splendidly adorned with paintings presented by the late Mr. Barry, the work of his own pencil, and surrounded by numerous models of articles, which render their inventors memorable, and their patrons more honourable members of society than the most adventurous military heroes of ancient or modern times.

Subscriptions for life, and by the year, and some other resources, supply the wants of the institution, which are confined to the actual ex-

penses of their hall, their officers, and servants, and the rewards honorary and pecuniary. In explaining their motives, they say their object is to promote the arts, manufactures, and commerce of this kingdom, by giving rewards for all such useful inventions, discoveries, or improvements, as tend to that purpose; and in pursuance of this plan, the society has already expended between forty and fifty thousand pounds, advanced by the voluntary subscription of their members, and legacies bequeathed. The manner in which the above vast sum has been distributed, is most honourably explained by the secretary and other officers at the hall, and the register, exhibited at the same time, will show the very great advantages which the public derives from the institution. The meetings of the society are held every Wednesday, at seven o'clock in the evening, from October to June, and the various committees on other evenings during the session. Each member has the privilege, on any weekly meeting, of proposing a candidate for admission, provided three members sign the written instrument prescribed for that purpose. Peers of the realm, or lords of parliament, are ballotted for immediately upon being proposed, but the names of all others must be inserted in a list which the secretary suspends in the meeting room; the person is then ballotted for, and if two thirds of the members present vote in his favour, he becomes a perpetual member on paying twenty guineas, or a subscribing member upon payment of any sum amounting to not less than two guineas per annum. Every member is admitted to participate in all the transactions of the society, and may attend and vote at the several committees; besides which, he has the privilege, at the weekly meetings, of proposing two persons as auditors of the general accounts, and, by addressing a note to the registrar, of introducing his friends to examine the numerous models, machines, and productions, in different branches of arts, manufactures, and commerce, for which rewards have been bestowed; and to inspect the magnificent series of moral and historical paintings, so happily contrived and completed by James Barry, Esq. which, with some valuable busts and statues, decorate the great room. He has also the use of a valuable library, and is entitled to the annual volume of the Society's Transactions.

Our limits will not permit us to give more than the heads of the subjects for which premiums are offered, as the ramifications of each are very numerous, in order to render the operations of the society as useful as possible. They are for planting and husbandry, containing fifty-seven classes; for discoveries and improvements in chemistry, dying, and mineralogy, in twenty-eight classes; for promoting the polite arts, including one class offered by the will of John Stock, Esq. for sculpture, twenty-two classes; for encouraging and improving manufactures, six classes; for inventions in mechanics, twelve classes; and to these are added premiums for the advantage of the British colonies, and the British settlements in the East Indies, in thirty-four classes. The premiums alluded to are medals of gold and silver, gold and silver pallets, and purses of ten, twenty, or thirty, &c. guineas.

Society for bettering the Condition of the Poor, was established in 1796. It is an establishment which has been the means of adding much to the general mass of national happiness. Its objects are described to be—"every thing that concerns the happiness of the poor—every thing by which their comforts can be increased. To remove the difficulties attending parochial relief, and the discouragement of industry and economy, by the present mode of distributing it; to correct the abuses of workhouses; and to assist the poor in placing out their children in the world:—in this, and in the improvement of their habitations and gardens; in assistance and information as to the use of fuel, so as to give them more benefit from it; and in adding to, and in meliorating their means of subsistence, by public kitchens, and by other means."—In these respects it has been proved that much may be done by the union of liberal and benevolent minds—much by the circulating of information, and by personal assistance and influence.

It must afford a strong additional inducement to efforts of this nature to consider, that, in proportion as we can multiply domestic comforts, in the same degree we may hope to promote the cause of morality and virtue. For a very gratifying illustration of this, as well as for the most important improvements in fuel, food, and in the mode of assisting the poor, the world is indebted to the philanthropy and abilities of Count Rumford.

It is not, however, merely the increase of the comforts and morals of the poor, great as that benefit may be, that this society has in a great measure effected: its improvements and experiments apply more or less to farms, manufactories, private families, and to every situation of life.

His majesty, the ready patron of every useful undertaking, when informed of the plan and object of the society, was graciously pleased to take it under his protection, and at a subsequent meeting the society came to the following resolution:

That the general object of the society be to collect information respecting the circumstances and situation of the poor, and the most effectual means of meliorating their condition; in order that any comforts and advantages which the poor do now actually enjoy in any part of England may eventually be extended to every part of it, with as much improvement and additional benefit as may be to the poor; and with a tendency gradually to diminish parochial expences. For the attainment of these ends, it appears to the society, that the circulation of useful and practical information, derived from experience, and stated briefly and plainly, so as to be generally read and understood, may be of very great national and individual benefit; and may induce and enable all well disposed persons to unite in the promotion of an object so important to the happiness and welfare of the community at large, and particularly of that valuable branch of it, the labouring poor.

The following are selected as the subjects of information, upon which the society is desirous of obtaining and circulating hints:

1. *Parish Relief*—how it may be best directed for the benefit of the poor.

2. *Friendly Societies*—their good effects, and how they may be best encouraged.

3. *Parish Workhouses*—the amendment of them.

4. *Cottages*—the increasing the comfort and neatness of them.

5. *Cottage Gardens*—and the means of enabling the cottager to keep a cow, or of supplying him with milk.

6. *Parish Mills* for corn; and parish ovens.

7. *Village Shops*, for better supplying the poor with the necessaries of life.

8. *Village Kitchens*, and *Soup Shops*.

9. *Cottage Fire-places and Chimneys*—the improvement of them.

10. *Fuel*—how the poor may be better supplied with it.

11. *Apprentices* to manufacturers, and all parish apprentices.

12. *County Jails*—the means and effects of reforming them.

13. *Beggars*—the least exceptionable modes of assisting them.

14. *Public Rooms* for the resort of the industrious poor in cold weather.

For proofs of what has been effected by the society already, we must refer to their published Reports.

British and Foreign Bible Society, one of such extreme importance, that we cannot possibly terminate our account of existing societies, without giving a condensed account of its origin and progress. Our forefathers have long been honoured with the gratitude they deserved, for having, at the period of the reformation, laid open those heavenly treasures to the eyes of the vulgar, and subsequently provided for their coming more immediately and generally into the hands of the people. Societies were formed, schools were founded, and other regulations adopted, for promoting this desirable work. Little, however, comparatively was done towards generalizing the knowledge of the Bible, till within the last fifty years; when an increased attention to education brought the minds of the common people more extensively into cultivation, and multiplied the readers of the Scriptures to a degree beyond all former example. To this, and other causes of similar operation, may be ascribed the superior estimation into which the Scriptures have risen of late years, and the strong disposition which has been manifested to promote their diffusion and reception among all orders of society. At length, an expedient was devised, of equal simplicity, liberality, and wisdom, for accomplishing this purpose, on a scale which promises eventually to comprehend, not merely the inhabitants of the British empire, nor the population of Christendom, but the whole family of man. This expedient was to separate the sacred text, upon which all Christians are agreed, and to which they appeal as their common standard, from every human interpretation, criticism, and comment; and to present it in this simple state, as an object of universal circulation, by Christians of every name and description. The proposition was acceded to, and practically adopted, by a respectable body, made up of members from various communions of professing Christians; and it was ushered into public notice, and recommended to public patronage and support, in the year 1804, under the designation of The British and Foreign Bible Society.

As this was the first religious institution of any magnitude and promise, which opened its arms for the reception of members, without any other test than that with which all Christians could conscientiously comply, it was naturally regarded with considerable interest. To some indeed it appeared so doubtful an experiment, that they could not be prevailed upon to join immediately in giving it the trial; while others, and those not a few, of almost every name and persuasion, saw in it the germ of Christian concord and social happiness; and rallied round it, as the standard of "piety and peace and pure religion."

Lord Teignmouth, a nobleman, who, in addition to the reputation he had acquired as governor-general of Bengal, was distinguished by talents, virtues, and manners, which made him equally an object of public consideration and private regard, accepted the appointment of president; as did the highly respected bishops of London, Durham, Salisbury, and St. David's, together with certain lay-lords and gentlemen of the highest character, that of vice-presidents, of this new and extraordinary association. It now numbers nineteen of our prelates, and more than ninety noblemen, among its patrons and supporters. Thus constituted and patronized, from the popularity of its plan and the exertions of its conductors, it obtained a rapid establishment in the world; and may be considered as already possessing a larger and more efficient operation than was ever acquired by any institution for charitable purposes to be met with in the records of mankind.

Upon its first appearance before the public, Wales and Scotland distinguished themselves by individual, congregational, and associated contributions to its funds; and rivalled each other and their fellow-christians in England, by the promptitude and liberality of their support. Ireland did not remain uninterested in this strife of love; but manifested as strong a disposition as its local impediments would allow, to aid in promoting so glorious a work. The continent of Europe felt the impulse which London had excited; and evinced the effects of it, in local associations for prosecuting the same common purpose, under the auspices and by the aid of the parent institution. Asia displayed a similar spirit, and Calcutta (where certain individuals from the Baptist Society had made a most auspicious beginning in the work of translations) became the seat of a corresponding committee; professing, in the name, and chiefly by the funds of the society in London, to aid and encourage translations of the Scriptures into all the vernacular dialects of the east. This initiatory measure has led to the establishment of the Calcutta Auxiliary Bible Society. America caught the same holy ardour; and a similar union of Christians, upon kindred principles, and with the same object in view, was speedily witnessed in various great towns, throughout the United States, which compose that vast and improving empire. Several of these associations have been assisted by voluntary donations from the British and Foreign Bible Society. Thus the flame which was kindled in London has been propagated generally over more than three-fourths of the world; and is on its way for a still more extensive and particular diffusion.

So vast is the confederacy which the society combines, and so momentous are its consequences likely to prove, that neither the philosopher nor the politician, any more than the Christian or the philanthropist, can be justified in neglecting to investigate its character, and to consider its probable influence on the condition of human society. And what phenomenon can be more calculated to excite astonishment, or to repay the labour of investigation, than that which is presented to the mind of the inquirer in this prodigious, complicated, and efficient machine?—a machine which, composed of various yet well adjusted parts, and covering a field of immense extent, is producing

an indefinite diffusion of that heavenly knowledge, which is alone adapted to make men wise, and good, and happy!

In order to form a just conception of this important institution, and to prognosticate its effects on the civilized world, it will be necessary to view it a little more nearly, and to enter more particularly into the details of its present vast and increasing magnitude.

The seat and centre of this institution is in London, the metropolis of the British empire, and in the foremost rank among the cities of the world. Its larger component parts are to be traced in auxiliary societies, or other aggregate associations, formed under its encouragement, and contributory to its object and operation, in several of the most considerable, and in some of the minor towns, throughout the United Kingdom; and in conspicuous and convenient stations, throughout the other portions of the world already enumerated. Its auxiliaries within the United Kingdom, amounting to at least 140, comprehend some of the most important and commanding positions. On the continent of Europe it has three auxiliaries of great activity, and operating under the most respectable patronage, in Stockholm, Berlin, and Bâsle. These stations, from their local position, and the conveniences, both literary and mechanical, with which they abound, are peculiarly favourable to the object of supplying the inhabitants of that continent with the Scriptures in their several languages. In Asia it possesses a powerful auxiliary, not only in its corresponding committee, but also in the Calcutta Society: an institution consisting of individuals of different Christian denominations; eminent alike for piety, learning, and station; and honoured with the countenance and support of the government in that place. Through these associations, and the instruments employed under their direction and encouragement, the society at home may expect to furnish the native Christians in India (amounting to nearly a million), with Bibles; to produce correct versions of the Scriptures in the various languages of the east; and to open channels for their circulation among millions of people, who might otherwise have remained utter strangers to the words of eternal life. In America the society is assisted in the prosecution of its object by the Bible Societies of Philadelphia, New York, Connecticut, Massachusetts, New Jersey, South Carolina, Maine, Savannah, &c. all produced by its example, aided by its funds, and acting in avowed communication and harmony with it. In addition to these regular and organized bodies, the society has correspondents of various descriptions, both among the clergy and the laity, in different parts of the world, actively engaged in promoting its designs, by dispersing, at its expense, the sacred oracles of divine truth "to men of every nation under heaven."

Nor are the extensions of this society, and its localization in so many regions more astonishing, than the effects which it has been enabled already to produce. The machine has been worked with such a degree of rapidity, and Providence has so abundantly favoured its motions, that the Reports of its facts, as annually detailed, may justly be classed with the most extraordinary records of exertion and success. In the short compass of six years,* it has issued from its depository in London, more than 325,000 copies of the Scriptures, independently of those which have been printed under its auspices, without the limits of the United Kingdom. In England it has printed the Scriptures, at its own expense, in the English, Welsh, Gaelic, French, Spanish, Portuguese, Italian, Dutch, Danish, Mohawk, Esquimaux, Modern Greek, Manks, and native Irish languages. In Europe it has largely aided the printing of them in the German, Bohemian, Polish, Icelandic, Swedish, Turkish, Laponese, Lithuanian, French, Romanese, Italian, Kalmuc, Esthonian, and Livonian languages. In Asia it has promoted, by liberal and repeated contributions, the translation and publication of them in Hindustanee, Bengalee, Persian, Arabic, Mahratta, Malayalim, Sanscrit, Chinese, Telinga, Tamul, Malay, Orissa, Seek, Burman, Carnatica, and several other dialects. The result of these operations has been, that many countries, remotely distant from each other, and from the parent source of supply, have already been furnished with copies of the Scriptures in their respective languages; and means have been created for insuring, under the auspices of Divine Providence, a diffusion of the same blessing among those nations on which the sun of revelation has never yet risen.

Nor has this splendid display of British munificence been without its merited tribute of admiration and gratitude. Appealing as it does to the best feelings of the heart, it has drawn them forth on innumerable occasions in the most animated effusions which language could convey. The impressions made by this catholic institution on the objects of its kindness both at home and abroad, have manifested themselves in addresses, replete with expressions of the most genuine pathos. It appears impossible for persons not enslaved by prejudice, or destitute of Christian sensibility, to read, without emotion, the foreign communications which enrich the Society's Annual Reports. A higher gratification can scarcely be imagined, than that of which the members of this institution so largely partake. To receive acknowledgments for the best of all gifts, from persons of every language and communion, on continents and islands, whether kindred or aliens, bond or free, friends or enemies; and those acknowledgments expressed in the language of their hearts, and written in their tears,—is a felicity which it was reserved for Christians of the nineteenth century to reap, through the medium of the British and Foreign Bible Society.

After presenting this sketch of an institution which reflects so much honour on the age and the country which gave it birth, a formal appeal, on its behalf, to the liberality of the public, would be superfluous. It has already expended, in the course of seven years, more than 81,000*l.* in promoting its object; and though its income in the seventh year amounted to 24,683*l.* this income fell short of the expenditure by 3,619*l.* besides a charge of more than 4,000*l.* on the balance in hand, chiefly on account of its foreign engagements. When these circumstances are considered, in connection with the general merits of the society, the inhabitants of the United Kingdom can want no additional motive to stimulate their exertions in promoting, both by personal contribution, and local association, the permanent interests of an institution, which promises, if liberally and extensively supported, to become a blessing to the whole earth.

The object of the British and Foreign Bible Society is, distinctly and exclusively, to promote,

* The society was not prepared with Bibles and Testaments for circulation till more than a year after its institution.

in the largest practicable extent, the circulation of the Holy Scriptures, without note or comment, both at home and abroad. By a fundamental law and regulation of the society, the copies circulated in the language of the United Kingdom are those of the authorized version only.

The constitution of the society comprehends all denominations of Christians, who profess to regard the Holy Scriptures as the proper standard of religious truth.

The proceedings of the society are conducted by a committee, consisting of thirty-six laymen, six of whom are foreigners residing in London and its vicinity; half of the remainder are members of the Church of England, and the other half members of other denominations of Christians.

The president, vice-presidents, and treasurer, are *ex officio* members of the committee; and every clergyman or dissenting minister who is a member of the society is entitled to attend and vote at all meetings of the committee.

One guinea annually constitutes a member; five guineas annually a governor; ten guineas at one time a life member; fifty pounds a life governor. Governors are entitled to attend and vote in the committee.

Members are entitled to purchase Bibles and Testaments at reduced prices (little more than half the retail prices), to five times the amount of their annual subscription: donors of ten guineas being classed with annual subscribers of one guinea, and donations of fifty pounds with those of five.

N. B. Auxiliary societies contributing the whole of their funds (necessary expenses excepted) are allowed to draw for Bibles and Testaments, estimated at the cost prices, within the year, to half the amount of the sum so contributed: their members retaining the same privilege of purchasing Bibles and Testaments at the local depository at reduced prices, as the members of the Parent Society enjoy from the London Depository.

The secretaries of this society, who have with astonishing perseverance, assiduity, and talent, laboured to promote its noble objects, from its formation to the present moment, are the Rev. John Owen, M.A. rector of Paglesham, Essex, and curate and lecturer of Fulham; Rev. Joseph Hughes, M.A. Battersea; and Rev. Chas. Fred. Steinkopff, minister of the German Lutheran chapel, Savoy, London.

Those who wish to form a correct estimate of the benefits this excellent society has already conferred upon the world, in diminishing the vices and misery of bad men, and promoting the harmony of good men, must turn to the annual volumes of their Reports.

SOCIETY ISLES, islands in the Pacific Ocean, discovered by captain Cook in 1769, situate between 150. 57 and 152. 0 W. lon. and 16. 10 and 16. 55 S. lat. They are six in number; namely, Huahine, Ulietea, Otaha, Bolabola, Maurua, and Tabooyamanoo or Saunders' island. The soil, productions, people, their language, religion, customs, and manners, are nearly the same as at Otaheite. Nature has been equally bountiful in uncultivated plenty, and the inhabitants are as luxurious and as indolent. A plantain branch is the emblem of peace, and changing names the greatest token of friendship. Their dances are more elegant, their dramatic entertainments have something of plot and consistency, and they exhibit tempofary occurrences as the objects of praise or satire; so that the origin of ancient comedy may be already discerned among them. The people of Huahine are in general stouter and fairer than those of Otaheite; and this island is remarkable for its populousness and fertility. Those of Ulietea, on the contrary, are smaller and blacker, and less orderly.

SOCINIANS, in ecclesiastical history, a sect of Antitrinitarians, who are said to have derived this denomination from the illustrious family of the Sozzini, which flourished a long time at Sienna, in Tuscany, and produced several great and eminent men; and, among others, Lælius and Faustus Socinus, who are commonly supposed to have been the founders of this sect. Lælius was the son of Marianus, a famous lawyer, and distinguished by his genius and learning, as well as by the lustre of an unblemished and virtuous conduct. Having conceived a disgust against popery, and disapproving many doctrines of the church, he left his country in 1547; and having passed four years in visiting France, England, Holland, Germany, and Poland, he at last fixed his residence at Zurich, in Switzerland, where he died in 1562, in the thirty-seventh year of his age. Although he adopted the Helvetic confession of faith, and professed himself a member of the church of Switzerland, he entertained doubts with respect to certain doctrines of religion, which he communicated to some learned men, whose judgment he respected, and in whose friendship he could confide. However, his sentiments were propagated in a more public manner after his death; as Faustus, his nephew and his heir, is supposed to have drawn from the papers he left behind him that religious system upon which the sect of the Socinians was founded. This Faustus Socinus was born at Sienna in 1539; and having continued many years in his own country, twelve of which he spent in the court of the grand-duke of Tuscany, he determined, in the year 1574, and the thirty-fifth of his age, to withdraw from Italy to Germany. During this period he had laboured under many disadvantages in the pursuit of knowledge, and his studies had been chiefly confined to the rudiments of logic and jurisprudence; but at Basil, where he first resided after his voluntary exile, he devoted himself for three years to the study of theology, under the direction and assistance of the writings of his uncle Lælius; and in 1577 he began to propagate his religious opinions without reserve or disguise. In 1578 he was invited by Blandrata, a person of eminence in Transylvania, to compose the commotions which were occasioned by a party, under the lead of Francis David, in the Antitrinitarian churches of that country. But failing of success, he removed to Poland in 1579, zealously wishing to join himself to the Unitarian churches; but here he suffered many vexations, and much opposition, from a considerable number of persons, who looked upon

some of his tenets as highly erroneous. At length, however, he vanquished the animosity of his enemies by his gentleness and firmness, by his address and eloquence, and the favour and protection of the nobility, with which he was honoured, and lived to form the Unitarians into one community, under his own superintendency and direction. Having retired to a village about nine miles from Cracow, he there closed his life, in the year 1604; and the following epitaph was inscribed on his tomb:

Tota licet Babylon destruxit tecta Lutherus,
Muros Calvinus, sed fundamenta Socinus.

i. e. Luther destroyed the houses of Babylon, Calvin the walls, but Socinus subverted the foundations. The sentiments of Socinus, with regard to the principal theological subjects controverted among Christians, will appear in the following abstract of them from his own writings; some of which were published during his own life, and some after his death; and the collection of them, in two volumes folio, forms part of the Bibliotheca Fratrum Polonorum. With regard to the nature and character of Christ, Socinus maintained that he was a man conceived and formed in the womb of the Virgin, without the intervention of a man, by the power of the Divine Spirit; on this account he was, in a peculiar sense, God's own and only begotten son, as no other person ever was the son of God in the same way, by the immediate origin of his being. Moreover, he was constituted the son of God by his resurrection from the dead, and was then begotten by God, when God raised him from the dead. As to those passages which have been supposed to assert Christ's existence in the heavenly world, previous to his birth and appearance among men, he explains them by alleging, that Christ himself, after he was born, and before he entered on the office assigned him by his Father, was, in consequence of the divine counsel and agency, in heaven, and remained there for some time; that he might hear from God, and being with him, as the Scripture says, might see those things which he was to announce to the world, in the name of God himself; though he explains John iii. 13, as figurative language. Accordingly, in explaining the first words of St. John's gospel, *In the beginning was the word*, &c. he observes, that the terms, *in the beginning*, do not relate to eternity, but to the order of those things which John was about to write concerning Jesus Christ; imitating Moses, who, in writing his history, opens his introduction with this word, *beginning*, in reference to the transactions which he was about to record. And Jesus is called the word, he supposes, not on account of his nature or substance, but because of the office he discharged when he revealed to us the word of the gospel from his Father. *The word was with God*, i. e. Jesus, as the word of God, before he was pointed out by the preaching of the Baptist, was known to God alone. And *the word was God:* the term God, says this commentator, does not denote substance, but authority, power, and munificence, which were derived from the Father, and which entitled Christ, according to the opinion of this writer, to adoration and worship. His ideas of the efficacy of our Lord's death and mediation are utterly repugnant to those that have been generally entertained by Calvinists, Baxterians, and Arminians. Nothing, he says, can be more incompatible with each other, than a free pardon and satisfaction. He adds, no man of judgment and piety ought to entertain the idea of a satisfaction for sin; since it plainly does very much derogate from the power and authority, or goodness and mercy of God; and though a propitiation be not the same thing as a satisfaction, and though God never refrained from the punishment of sin on account of any real satisfaction given him, yet it is certain, that in remitting the punishment of our sins by Jesus Christ, no propitiation intervened; but God hath, from his free will, exhibited himself so propitious to us in Christ, as not to exact the punishment of our sins, though he might justly have done it. However, he allows not only that the death of Christ, and the pouring out of his blood for us, was an offering and sacrifice to God, but that this sacrifice may be said to have been offered up for our sins, in order to their being forgiven; yet he apprehended that this sacrifice, as far as it was expiatory, was offered by Christ, not on the cross, but in heaven itself, after his resurrection. To which purpose he observes, that Christ did not obtain eternal redemption for us before he entered into the holy place, and there assumed the priesthood; and without a priesthood no expiatory offering could be made.

Socinus does also expressly deny the distinct personality of the Holy Ghost; understanding by the Holy Spirit, a divine energy or influence.

With respect to the nature and state of man, Socinus thought, that the progenitor of our race was mortal, i. e. liable to death, by reason of his frame, and incapable of exemption, without an exertion of the divine favour and influence, which was not granted to him at creation; and, therefore, when the apostle asserts, that by sin death entered into the world, he meant not natural mortality, but the necessity of dying, or eternal death. To this purpose he explains himself: Adam, if he had not sinned, might have been preserved from death by the kindness of God, though naturally mortal; or, if he had died, have been restored to life, and made immortal. By his sin he did as it were refuse to give himself and his posterity this blessing; and, therefore, unless the favour of God be renewed to us, we must all die, and remain in the state of the dead. As to the nature of the human soul, it seems to have been the opinion of Socinus, that after this life it doth not so subsist itself without the body, as to be capable of any reward or punishment, or any sensations at all. To the question, whether the first man had any original righteousness before he sinned? Socinus replies, that if by original righteousness he

meant such a condition that he could not sin, this certainly was not the state of Adam, as it is clear he did sin. But if original righteousness consisted in this, that his reason had the absolute rule over his appetites and senses, and invariably directed them, then the opinion of those who ascribe it to Adam is supported by no argument: hence it should seem, from Adam's fall, that there was no perfect harmony between them, and that his appetites and senses had the dominion over his reason. If it be asked, says Socinus, whether there is original sin? he answers, this is the same as the inquiry, whether men, when they are born, because they derive their origin from Adam, have, on account of his fall, contracted any guilt or punishment, or are obnoxious to either? Therefore, since the consent of the will must constitute guilt, and there can be no punishment without antecedent guilt, it seems not at all possible that either of these should pertain to a man when he is born, as he neither has, nor could have before, any use of his own will. If by original sin he understood certain innate desires, or evil concupiscence in man, and a proneness to sin, this opinion Socinus denies and labours to refute; concluding, upon the whole, that there is no such thing as original sin, i. e. a taint or pravity in consequence of the sin of the first man, necessarily produced, or by any means inflicted on the human race; and that no other evil necessarily flows to all his posterity from that first transgression, than by some means or other the necessity of dying; not indeed through the influence of that transgression, but because man, being naturally mortal, was on that account left by God to his own natural mortality, and what was natural became necessary as a punishment on the offender; consequently, they who are born of him, must be born in the same circumstances, for he was deprived of nothing he naturally had or could have. From reasoning on this subject, Socinus concludes that there is a freedom of will in man, and that the powers of man are not so few and feeble but that he may, with the assistance of God, obey the divine law by the right use and application of his powers. Divine assistance he considers as external and internal; and the latter, he says, is twofold; the one, when God by some means impresseth on the heart what he hath promised to them that obey him; and the other, when he instructs and illuminates the mind rightly to discern his will, in those instances which cannot be expressly contained in his written word: however, this internal assistance belongs only to those who have made good use of the external. The doctrine of predestination Socinus absolutely denies, and he endeavours to account for the prescience of the Deity, without admitting that notion of his decrees which some divines have adopted. On the head of justification, Socinus observes, that God out of his mere mercy justifies us, i. e. pronounces us righteous, and grants us forgiveness of sins, and eternal life; but he requireth from us, before this be done, that we believe in Christ, i. e. confide in and obey him; and our good works, or the obedience we render to Christ, though not the efficient or meritorious cause, are the *sine qua non*, or indispensable pre-requisite of our justification before God, and eternal salvation. But if any should deviate from this obedience, by falling into sin and continuing therein, they cease to be justified; nevertheless, by repentance and amendment of life they may be justified again; but this second repentance, he says, is not in our power, God granting an ability for it to whom he pleaseth.

Socinus denied the perpetuity of baptism as an ordinance in the church, alleging that it was not prescribed for those who in any other way have publicly given their names to Christ, or from their earliest years have been educated in the Christian discipline; or if it is to be retained in these days, he apprehends it should be retained principally on account of those who have been converted from other religions to the Christian. He farther thought, that, in order to the right administration of baptism, it is previously necessary that the baptized person should be a believer, and he therefore reckoned the practice of infant baptism unscriptural and erroneous.

The Socinians, like other sects distinguished by one general denomination, are divided into several parties. Some differ from Socinus with regard to the worship of Christ; some deny the eternity of the future punishment of the wicked, and some apprehend it contradictory to maintain God's foreknowledge of future contingencies, &c. Many of them, therefore, assume to themselves other names, such as Rational Christians, Unitarians, Scriptural Christians, &c. And, in truth, it is a curious kind of scriptural Christianity which they profess; for, since the days of Dr. Priestley, they have discovered what escaped the sagacity of all the Fratres Poloni, that Jesus Christ was the son of Joseph as well as Mary; that the evangelists mistook the meaning of Isaiah's prophecy, that "a virgin should conceive and bear a son;" that the applying of this prophecy to the birth of our Saviour led them to conclude that his conception was miraculous; and that we are not to wonder at this mistake, as the apostles were not always inspired, and were in general inconclusive reasoners. Nay, farther, Dr. Priestley affirms, that "the plenary inspiration of Christ" is no less to be disbelieved than that of the apostles; and some of his followers have found out, that when our Lord promised the thief on the cross he should that day be with him in Paradise, the promiser had mistaken notions respecting the state of the dead,—that Jesus Christ may even now be living in some obscure part of the earth,—and that there are no satanic beings, or if there are they have no influence. Whether such extravagancies as these should be called Socinianism or not, we do not determine;

but certainly there cannot be a greater misnomer than to call them rational or scriptural Christianity.

But the term by which they who now approximate to the opinions of Socinus are most anxious to be distinguished, is that of Unitarians. Yet surely the term Socinians is more fair, because it is more discriminating and characteristic. We would call them Socinians, then, not by way of reproach (for it appears to us that they have deviated much farther from the true standard of Christian faith than either of the Socinuses did), but because the name Unitarians is not a fair one. The term, as constantly explained by themselves, signifies those who depart from "the false worship of *three* Gods, to the worship of the *one* true God." See Mr. Frend's addresses to the inhabitants of Cambridge, under that title. Yet what professors of Christianity are there who pretend to worship a plurality of gods? Trinitarians profess also to be Unitarians; they, as well as their opponents, believe there is but *one* God. To give Socinians, therefore, this name exclusively, would be conceding them the very point which they seem so desirous to take for granted, that is to say, the point in debate.

The question, whether the Socinians or the classes of Christians whose sentiments they mainly oppose, are in the right, appears to us more important than any other that has been made the subject of controversy. We have not room to enter into the discussion in this place; but would refer those who are still in doubt as to this momentous subject to our articles JESUS, ATONEMENT, HELL, &c. Also to Horsley's most able Tracts in controversy with Dr. Priestley; Fuller's masterly work, entitled The Calvinistic and Socinian Systems compared as to their moral Tendency; the remarks of Nares, Lawrence, &c. upon the Socinian Version of the New Testament; and the 2d. vol. of Gregory's Letters on the Evidences, Doctrines, and Duties of the Christian Religion.

SOCINUS. See SOCINIANS.

SOCK. *s.* (*socus*, Latin; rocc, Saxon; *socke*, Dutch.) 1. Something put between the foot and shoe (*Bacon*). 2. The shoe of the ancient comic actors, taken in poems for comedy (*Milton*).

SO'CKET. *s.* (*souchette*, French.) 1. Any hollow pipe; generally the hollow of a candlestick (*Collier*). 2. The receptacle of the eye (*Dryden*). 3. Any hollow that receives something inserted (*Bacon*).

SO'CKETCHISEL. *s.* A stronger sort of chisel (*Moxon*).

SO'CLE. *s.* (with architects.) A flat square member, under the bases of pedestals of statues and vases (*Bailey*).

SO'CMAN or SOCCAGER. *s.* (rocarman, Saxon.) A sort of tenant that holds lands and tenements by soccage (*Cowell*).

SO'COME. *s.* A custom of tenants obliged to grind corn at their lord's mill (*Bailey*).

SOCRATES, a most celebrated ancient moral and natural philosopher, was a native of Athens. His father, Sophroniscus, was a statuary; he followed for some time the occupation of his father, but was called away from this employment by Crito, who admired his genius, and courted his friendship. Philosophy soon became the study of Socrates, and under Archelaus and Anaxagoras he laid the foundation of that exemplary virtue which succeeding ages have so much venerated. He appeared like the rest of his countrymen in the field of battle, and fought with boldness and intrepidity. But the character of Socrates appears more conspicuous as a philosopher and moralist than as that of a warrior. He was fond of labour, and he inured himself to suffer hardships. If he was poor, it was from choice, and not the effects of vanity or the wish of appearing singular. He bore injuries with patience, and the insults of malice or resentment he treated with contempt. Socrates was attended by a number of illustrious pupils, whom he instructed by his exemplary life, as well as by his doctrines. He had no particular place where to deliver his lectures, but was present every where, and drew the attention of his auditors either in the groves of Academus, the Lyceum, or on the banks of the Ilyssus. He spoke with freedom on every subject, religious as well as civil. This independence of spirit and superiority of mind, over the rest of his countrymen, created him many enemies. Aristophanes, at the instigation of Melitus, in his comedy of the Clouds, undertook first to ridicule the venerable character of Socrates on the stage; and the fickle populace soon ceased to pay reverence to the philosopher whom they had before regarded as a being of a superior order. Anitus, Militus, and Lycon, then stood forth to criminate him, and the philosopher was summoned before the tribunal of the five hundred. He was accused of making innovations in the religion of the Greeks, and of ridiculing the many gods which the Athenians worshipped. In his apology he spoke with great animation, and the whole of his discourse was full of simplicity and noble grandeur. Socrates was condemned, but only by a majority of three voices, to drink hemlock. The solemn celebration of the Delian festivals prevented his execution for 30 days, during which time he discoursed with his friends and pupils upon different subjects with his usual cheerfulness and serenity. He reproved them for their sorrow, and when one of them was uncommonly grieved because he was to suffer, though innocent, the philosopher replied, "Would you then have me die guilty?" With this composure he continued to be a preceptor till the moment of his death. He disregarded the intercession of his friends, and when it was in his power to make his escape out of prison, he refused it. When the hour to drink the poison was come, the executioner presented him the cup with tears in his eyes, Socrates received it with composure, and after

he had made a libation to the gods, he drank it with an unaltered countenance, and a few moments after he expired. Socrates died about 400 years before Christ, in the 70th year of his age. He was no sooner buried than the Athenians repented of their cruelty, and his accusers were universally despised and shunned. The actions, sayings, and opinions of Socrates have been faithfully recorded by two of the most celebrated of his pupils, Xenophon and Plato, and his philosophy forms an interesting epoch in the history of the human mind. From his principles, which were enforced with the unparalleled example of a tender parent, a warlike soldier, and a patriotic citizen in Socrates, soon after the celebrated sects of the Platonists, the Peripatetics, Academics, Cyrenaics, Stoics, &c. arose. Socrates publicly declared that he was accompanied by a dæmon, or invisible conductor (see DÆMON), whose frequent interposition stopped him from the commission of evil, or guilt of misconduct, &c. There were others also of his name, but of inferior celebrity.

They who affirm that Socrates wrote nothing, mean only in respect to his philosophy; for it is attested and allowed, that he assisted Euripides in composing tragedies, and was the author of some pieces of poetry. Dialogues also and epistles are ascribed to him: but his philosophical disputations were committed to writing only by his scholars; and that chiefly by Plato and Xenophon. The latter set the example to the rest in doing it first, and also with the greatest punctuality; as Plato did it with the most liberty, intermixing so much of his own, that it is hardly possible to know what part belongs to each. Hence Socrates, hearing him recite his Lysis, cried out, "How many things doth this young man feign of me!" Accordingly, the greatest part of his philosophy is to be found in the writings of Plato. To Socrates is inscribed the first introduction of moral philosophy. Man having a twofold relation to things divine and human, his doctrines were with regard to the former metaphysical, to the latter moral. His metaphysical opinions were chiefly, that, There are three principles of all things, God, matter, and idea. God is the universal intellect; matter the subject of generation and corruption; idea, an incorporeal substance, the intellect of God; God the intellect of the world. God is one, perfect in himself, giving the being and well-being of every creature. That God, not chance, made the world and all creatures, is demonstrable from the reasonable disposition of their parts, as well for use as defence; from their care to preserve themselves, and continue their species. That he particularly regards man in his body, appears from his noble upright form, and from the gift of speech; in his soul, from the excellency of it above others. That God takes care of all creatures, is demonstrable from the benefit he gives them of light, water, fire, and fruits of the earth in due season. That he hath a particular regard of man, from the destination of all plants and creatures for his service; from their subjection to man, though they may exceed him ever so much in strength; from the variety of man's sense, accommodated to the variety of objects, for necessity, use, and pleasure; from reason, by which he discourseth through remiaiscence from sensible objects; from speech, by which he communicates all he knows, gives laws, and governs states. Finally, that God, though invisible himself, at once sees all, hears all, is every where, and orders all.

As to the other great object of metaphysical research, the soul, Socrates taught, that it is pre-existent to the body, endued with the knowledge of eternal ideas, which in its union to the body it loseth, as stupified, until awakened by discourse from sensible objects; on which account, all its learning is only reminiscence, a recovery of its first knowledge. That the body, being compounded, is dissolved by death; but that the soul, being simple, passeth into another life, incapable of corruption.

It should be remarked, however, that Socrates is by no means decisive in his teaching of these doctrines; but often vacillates in his sentiments, and not unfrequently, indeed, goes into downright polytheism. Thus, he represents the worshipping not of one God, but of the gods, or the first law of nature; he was in the habit of consulting the oracle to know the will of the gods; and his dying injunction to Crito was, "Be sure you sacrifice *a cock* to Æsculapius!" He also mixes the doctrine of the transmigration of souls with that of a future state of existence.

SOCOTORA, an island lying between Asia and Arabia Felix; about 50 miles in length, and 22 in breadth. It is particularly noted for its fine aloes, known by the name of Socotrine aloes. The religion of the natives is a mixture of Mahometanism and Paganism; but they are civil to strangers who call there in their passage to the East Indies. It abounds in fruit and cattle; and they have a king of their own, who is dependent on Arabia.

SOD. *s.* (*soed*, Dutch.) A turf; a clod.

SOD. The preterit of *seethe*.

SODA. (*der sodt*, German.) Barilla, Natron or Natrum. An alkali of similar properties, and when procured from plants, obtained by the same means as POTASS, to which article we refer. It is far more largely, however, procured in a mineral form, and hence has been peculiarly called fossile or mineral alkali, and was known to the ancients (though not in a state of purity) under the names of νίτρον and nitrum. Strictly speaking, it is an oxyd of the very peculiar and newly discovered metal to which Mr. (now sir Humphry) Davy has given the name of SODIUM, which see.

It is found in large quantities combined with carbonic acid in different parts of the earth, especially in Egypt; and common salt is

a compound of soda and muriatic acid. But the soda of commerce is obtained from the ashes of different species of the salsola, a genus of plants which grow upon the sea-shore, especially from the salsola soda, from which the alkali has obtained its name. The soda of commerce is also called barilla, because the plant from which it is obtained bears that name in Spain. Almost all the algæ, especially the fuci, contain also a considerable quantity of soda. The ashes of these plants are known in this country by the name of kelp; in France they are called varec.

The soda, or barilla of commerce, is far from being pure; besides carbonic acid, it contains common salt, and several other foreign ingredients; but it may be obtained perfectly pure by the processes for purifying potass. (See that article.)

Soda and potass resemble each other so nearly, that they were confounded together till Du Hamel published his dissertation on common salt in the Memoirs of the French Academy for 1736. He first proved that the base of common salt is soda, and that soda is different from potass. His conclusions were objected to by Pott, but finally confirmed by Margraff in 1758.

Soda is of a greyish-white colour, and agrees exactly with potass in its taste, smell, and action upon animal bodies; but its specific gravity is only 1.336, and according to Hassenfratz only 1.33, whereas that of potass amounts to 1.70. Soda combines with silex and other vitrifiable ingredients into a glass, in the same manner as potass does, but the glass obtained from it is harder. On the other hand, the soaps produced by combining soda with oil or tallow are hard and solid, while those made with potass are soft and gelatinous. The two alkalies are still more distinguishable when united to the different acids producing compound salts, and a considerably smaller proportion of soda than of potass will saturate a given quantity of acid. The salts with a base of soda are for the most part more soluble than the corresponding ones with a base of potass, and in the force of its chemical affinity soda appears to be somewhat inferior to potass; this however is no doubt increased by the superior solubility of its salts. In general soda is applied to the same use as potass, and the preference given to either over the other is often determined merely by their relative commercial value. In the preparation of hard soap, however, and the softer kinds of glass, there is a real ground for preference. For the rest, see NATRUM.

SODA ACETATA. A neutral salt formed of a combination of acetous acid with the mineral alkali. It is also called terra foliata tartari crystallizabilis, natron acetatum et sal diureticum vegetabile crystallizatum. It possesses similar virtues to the kali acetatum, and may be easily kept dry.

SODA BORAXATA. See BORAX.

SODA HISPANICA. Impure soda. See NATRUM.

SODA HISPANICA PURIFICATA. Pure soda. See NATRON PREPARATUM.

SODA MURIATA. See MURIAS SODÆ.

SODA MURIATICA. Common culinary salt. See MURIAS SODA.

SODA PHOSPHORATA. Alkali minerale phosphoratum of Bergman. This preparation is a phosphat of soda, and therefore called phospas sodæ in the new chemical nomenclature. It is cathartic in the dose of half an ounce to an ounce; dissolved in gruel is no way unpleasant, and is said to be useful, in scrophula, bronchocele, rachitis, and gout, in small doses.

SODALITE, a mineral lately discovered by Dr. Thomson, possessing a near resemblance to the natrolite of Klaproth, but which has sufficiently distinctive characters for a separate place. We cannot do better than copy his own very lucid account of it, as communicated to the Royal Society of Edinburgh.

"The mineral," says he, "to which I have given the name of sodalite was put into my hands by Mr. Allan. In the Greenland collection which he purchased there were several specimens of a rock, obviously primitive. In the composition of these the substance of which I am about to treat formed a constituent, and, at first appearance, was taken for felspar, to which it bears a very striking resemblance.

"This rock is composed of no less than five different fossils, namely, garnet, hornblende, augite, and two others, which form the paste of the mass. These are evidently different minerals; but in some specimens are so intimately blended, that it required the skill of count Bournon to make the discrimination, and ascertain their real nature. Even this distinguished mineralogist was at first deceived by the external aspect, and considered the paste as common lamellated felspar, of a greenish colour. But a peculiarity, which presented itself to Mr. Allan in one of the minerals, induced him to call the attention of count Bournon more particularly to its construction.

"On a closer examination of the mineral Mr. de Bournon found, that some small fragments, which he had detached, presented rectangular prisms, terminated by planes, measuring, with the sides of the prism, 110° and 70° or nearly so, a form which belongs to a rare mineral, known by the name of sahlite, from Sweden. He farther observed, intermixed along with this, another mineral; and after some trouble, succeeded in detaching a mass, presenting a regular rhomboidal dodecahedron. It was to this form that Mr. Allan had previously requested his attention.

"Some time before this investigation, Mr. de Bournon had examined a mineral from Sweden, of a lamellated structure, and a greenish colour, which he found indicated the same form. From this circumstance, together with some external resemblance, which struck him, he was induced to conclude, that our mineral was a variety of that substance.

"To that substance the name of Swedish natrolite had been given, in consequence of

the investigation of Dr. Wollaston, who found that it contained a large proportion of soda.

"There are few minerals, however, that are so totally distinct in their external characters as the natrolite of Klaproth, and the substance we are now treating of. The mineral examined by Klaproth occurs at Roegan, on the Lake of Constance, in porphyry-slate, coating the sides of veins and cavities in a mamellated form, the texture of which is compact, fibrous, and radiated; the colour pale yellow, in some places passing into white, and marked with brown zones. Hitherto it had never been found in a state sufficiently perfect to afford any indications of form. Lately, however, Mr. de Bournon was so fortunate as to procure some of it, presenting very delicate needleform crystals, which, by means of a strong magnifier, he was able to ascertain presented flat rectangular prisms, terminated by planes, which, he thought, might form angles of 60° and 120 with the sides of the prism. With this neither our mineral nor the Swedish can have any connection, farther than some analogy which may exist in their composition.

"Concerning the Swedish mineral I have not been able to obtain much satisfactory information. There is a specimen of it in Mr. Allan's cabinet, which he received directly from Sweden, sent by a gentleman who had just before been in London, and was well acquainted with the collections of that city, from which it is inferred, that the specimen in question is the same as that examined by count Bournon and Dr. Wollaston.

"Werner has lately admitted into his system a new mineral species, which he distinguishes by the name of fettstein. Of this I have seen two descriptions; one by Haüy, in his Tableau Comparatif, published last year; and another by count Dunin Borkowski, published in the 69th volume of the Journal de Physique, and translated in Nicholson's Journal, vol. xxvi. p. 384. The specimen, called Swedish natrolite, in Mr. Allan's possession, agrees with these descriptions in every particular, excepting that its specific gravity is a little higher. Borkowski states the specific gravity of fettstein at 2·563; Haüy at 2·6138; while I found the specific gravity of Mr. Allan's specimen to be 2·779, and, when in small fragments, to be as high as 2·790. This very near agreement in the properties of the Swedish natrolite with the characters of the fettstein leads me to suppose it the substance to which Werner has given that name. This opinion is strengthened, by a fact mentioned by Haüy, that fettstein had been at first considered as a variety of wernerite. For the specimen sent to Mr. Allan, under the name of compact wernerite, is obviously the very same with the supposed natrolite of Sweden. Now, if this identity be admitted, it will follow, that our mineral constitutes a species apart. It bears, indeed, a considerable resemblance to it; but neither the crystalline form, nor the constituents of fettstein, as stated by Haüy, are similar to those of the mineral to which I have given the name of sodalite. The constituents of fettstein, as ascertained by Vauquelin, are as follows:

Silica	44·00
Alumina	34·00
Oxyd of iron	4·00
Lime	0·12
Potash and soda	16·50
Loss	1·38
	100·00

"Sodalite, as has been already mentioned, occurs in a primitive rock, mixed with sahlite, augite, hornblende, and garnet.

"It occurs massive; and crystallised, in rhomboidal dodecahedrons, which, in some cases, are lengthened, forming six-sided prisms, terminated by trihedral pyramids.

"Its colour is intermediate between celandine and mountain green, varying in intensity in different specimens. In some cases it seems intimately mixed with particles of sahlite, which doubtless modify the colour.

"External lustre glimmering, internal shining, in one direction vitreous, in another resinous.

"Fracture foliated, with at least a double cleavage; cross fracture conchoidal.

"Fragments indeterminate; usually sharp-edged.

"Translucent.

"Hardness equal to that of felspar. Iron scratches it with difficulty.

"Brittle.

"Easily frangible.

"Specific gravity, at the temperature of 60°, 2·378. The specimen was not absolutely free from sahlite.

"When heated to redness, does not decrepitate, nor fall to powder, but becomes dark gray, and assumes very nearly the appearance of the Swedish natrolite of Mr. Allan, which I consider as fettstein. If any particles of sahlite be mixed with it, they become very conspicuous, by acquiring a white colour, and the opacity and appearance of chalk. The loss of weight was 2·1 per cent. I was not able to melt it before the blow-pipe.

"1. A hundred grains of the mineral, reduced to a fine powder, were mixed with 200 grains of pure soda, and exposed for an hour to a strong red heat, in a platinum crucible. The mixture melted, and assumed, when cold, a beautiful grass-green colour. When softened with water, the portion adhering to the sides of the crucible acquired a fine brownish-yellow. Nitric acid being poured upon it, a complete solution was obtained.

"2. Suspecting, from the appearance which the fused mass assumed, that it might contain chromium, I neutralised the solution, as nearly as possible, with ammonia, and then poured into it a recently prepared nitrate of mercury. A white precipitate fell, which being dried, and exposed to a heat rather under redness, was all dissipated, except a small portion of gray matter, not weighing quite 0·1 grain. This matter was insoluble in acids, but be-

same white. With potash it fused into a colourless glass. Hence I consider it as silica. This experiment shows, that no chromium was present. I was at a loss to account for the precipitate thrown down by the nitrate of mercury. But Mr. Allan having shown me a letter from Ekeberg, in which he mentions, that he had detected muriatic acid in sodalite, it was easy to see that the white precipitate was calomel. The white powder weighed 26 grains, indicating, according to the analysis of Chenevix, about three grains of muriatic acid.

"3. The solution, thus freed from muriatic acid, being concentrated by evaporation, gelatinised. It was evaporated nearly to dryness; the dry mass digested in hot water acidulated with nitric acid, and poured upon the filter. The powder retained upon the filter was washed, dried, and heated to redness. It weighed 37·2 grains, and was silica.

"4. The liquor which had passed through the filter was supersaturated with carbonate of potash, and the copious white precipitate which fell collected by the filter, and boiled while yet moist in potash-lie. The bulk diminished greatly, and the undissolved portion assumed a black colour, owing to some oxyd of mercury with which it was contaminated.

"5. The potash-lie being passed through the filter, to free it from the undissolved matter, was mixed with a sufficient quantity of sal-ammoniac. A copious white precipitate fell, which being collected, washed, dried, and heated to redness, weighed 27·7 grains. This powder, being digested in sulphuric acid, dissolved, except 0·22 of a grain of silica. Sulphat of potash being added, and the solution set aside, it yielded alum crystals to the very last drop. Hence the 27·48 grains of dissolved powder were alumina.

"6. The black residue, which the potash-lie had not taken up, was dissolved in diluted sulphuric acid. The solution being evaporated to dryness, and the residue digested in hot water, a white soft powder remained, which, heated to redness, weighed 3·6 grains, and was sulphat of lime, equivalent to about 2 grains of lime.

"7. The liquid from which the sulphat of lime was separated, being exactly neutralised by ammonia, succinate of ammonia was dropped in; a brownish red precipitate fell, which, being heated to redness in a covered crucible, weighed one grain, and was black oxyd of iron.

"8. The residual liquor being now examined by different reagents, nothing farther could be precipitated from it.

"9. The liquid (No. 4.) from which the alumina, lime, and iron had been separated by carbonat of potash, being boiled for some time, let fall a small quantity of yellow-coloured matter. This matter being digested in diluted sulphuric acid, partly dissolved, with effervescence; but a portion remained undissolved, weighing 1 grain. It was insoluble in acids, and with potash melted into a colourless glass. It was therefore silica. The sulphuric acid solution being evaporated to dryness, left a residue, which possessed the properties of sulphat of lime, and which weighed 1·2 grains, equivalent to about 0·7 of a grain of lime.

"10. The constituents obtained by the preceding analysis being obviously defective, it remained to examine whether the mineral, according to the conjecture of Bournon, contained an alkali. For this purpose, 100 grains of it, reduced to a fine powder, and mixed with 500 grains of nitrat of barytes, were exposed for an hour to a red heat, in a porcelain crucible. The fused mass was softened with water, and treated with muriatic acid. The whole dissolved, except 25 grains of a white powder, which proved on examination to be silica. The muriatic acid solution was mixed with sulphuric acid, evaporated to dryness; the residue, digested in hot water, and filtered, to separate the sulphat of barytes. The liquid was now mixed with an excess of carbonat of ammonia, boiled for an instant or two, and then filtered, to separate the earth and iron precipitated by the ammonia. The liquid was evaporated to dryness, and the dry mass obtained exposed to a red heat in a silver crucible. The residue was dissolved in water, and exposed in the open air to spontaneous evaporation. The whole gradually shot into regular crystals of sulphat of soda. This salt, being exposed to a strong red heat, weighed 50 grains, indicating, according to Berthollet's late analysis, 23·5 grains of pure soda. It deserves to be mentioned, that during this process the silver crucible was acted on, and a small portion of it was afterward found among the sulphat of soda. This portion was separated before the sulphat of soda was weighed.

"The preceding analysis gives us the constituents of sodalite as follows:

Silica,	38·52
Alumina,	27·48
Lime,	2·70
Oxyd of iron,	1·00
Soda,	23·50
Muriatic acid,	3·00
Volatile matter,	2·10
Loss,	1·70
	100·00

"Mr. Allan sent a specimen of this mineral to Mr. Ekeberg, who analysed it in the course of last summer. The constituents which he obtained, as he states them in a letter to Mr. Allan, are as follows:

Silica,	36·
Alumina,	32·
Soda,	25·
Muriatic acid,	6·75
Oxyd of iron,	0·25
	100·00

"This result does not differ much from mine. The quantity of muriatic acid is much greater than mine. The lime and the volatile matter, which I obtained, escaped his notice altogether. If we were to add them to the alumina, it would make the two analyses almost

the same. No mineral has hitherto been found containing nearly so much soda as this. Hence the reason of the name by which I have distinguished it."

SODA'LITY. *s.* (*sodalitas*, Lat.) A fellowship; a fraternity (*Stillingfleet*).

SO'DDEN. (part. pass. of *seethe*.) Boiled; seethed (*Dryden*).

To SO'DER. *v. a.* (*souder*, Fr. *souderen*, Dutch.) To cement with some metallic matter. See SOLDER (*Isaiah*).

So'DER. *s.* Metallic cement (*Collier*).

SODIUM, a metal of most singular character recently discovered by sir Humphry Davy, and obtained by a decomposition of soda, whence its name.

For the little knowledge we at present possess of the basis of the alkalies we are entirely indebted to this consummate chemist. The apparatus which he found most successful in decomposing them was a voltaic circle, in the action of which he had previously observed that if a neutral substance, or a compound of an acid and an alkali, constituted a part, a decomposition was here also the result, during which the acid always travelled alone to the positive side of the chain and the alkali to the negative.

Having attempted to decompose the alkalies without success by a variety of other means, he fortunately had recourse to this kind of machinery, and found that potash, just so far moistened as to become a conductor, might be hereby decomposed, and he decomposed it accordingly in a dish of platina, as well as of various other metals, and other substances; and in the progress of the decomposition, he perceived that the upper surface of the potash, towards which the positive wire was applied, fused with great effervescence, while the lower surface, or that resting on the platina dish, which was supported by the negative wire, fused without any effervescence; and that during the fusion, on the lower surface, a vast number of metallic globules were emitted or produced, exquisitely small, and to the eye in every respect resembling globules of quicksilver except in their specific gravity; the globules from the alkali being so light as to float upon naphtha, the lightest liquid we know of. Upon exposure to air, or to any substance containing oxygen (which gass it is clear, from the effervescence that had taken place, must have flown off and in considerable quantity towards the upper or positive wire, and produced such effervescence by its superabundance in regard to the upper lamina of potash upon which it acted as an acid) these globules were instantly changed to pure potash again, in consequence of their recovering the oxygen they had lost by decomposition. It is hence obvious that potash is a true and genuine oxyd of a peculiar metal, which from its disposition to unite with various substances, and to change its form with every substance that contains oxygen, for which it has the closest affinity, it is not easy to keep pure and simple. It was found to retain its metallic form best in naphtha.

Having made this discovery with respect to potash, professor Davy next subjected soda to a similar train of experiments; and here also he obtained a metal of a similar kind, but less fusiblet han the preceding, and of greater specific gravity. To the metal thus obtained he gave the name of sodium, as he had already determined upon giving the name of potasium to that obtained from potash. From various additional experiments to ascertain the relative proportions of the bases and of oxygen in these alkalies, he was led to conclude that 100 parts of potash consist of about 84 basis, and 16 oxygen; and 100 parts of soda of about 76 or 77 basis, and 23 or 24 oxygen. The specific gravity of sodium to that of water is as 9 to 10 nearly. It melts at 120° of Fahrenheit, and is quite fluid at 180°, and notwithstanding the wide deviation of these substances from other metals, in regard to specific gravity, they concur with them in opacity, lustre, malleability, conducting powers as to heat and electricity, and in their qualities of chemical combinations. Even their low specific gravity does not appear a sufficient reason for placing them in a class of bodies separate from the metals, since in many of these last we meet with remarkable differences upon this very point, platina being four times as heavy as tellurium, while tellurium is not much more than six times as heavy as sodium on the base of soda.

In his experiments upon the volatile alkali, sir Humphry has not hitherto been altogether so successful as in those upon the fixed alkalies, but he has been able to obtain a metallic material in the form of amalgamation, though not in the form of pure metal; and to this metallic substance he has given the name of ammonium.

The whole of this series of experiments is one of the most brilliant and important that has taken place in modern chemistry. We have pursued it already at some length in the article POTASIUM, and to that article we refer the reader.

SODOM, formerly a town of Palestine in Asia, famous in Scripture for the wickedness of its inhabitants, and their destruction by fire from heaven on account of that wickedness. The place where it stood is now covered by the waters of the Dead Sea, or the Lake Asphaltites. See ASPHALTITES.

SODOMY, an unnatural crime, so called from the city of Sodom, which was destroyed by fire for the same. The Levitical law adjudged those guilty of this execrable crime to death; and the civil laws assign the same punishment to it. The law of England makes it felony. There is no statute in Scotland against sodomy; the libel of the crime is therefore founded on the divine law, and practice makes its punishment to be burnt alive.

SODOR, a village in Icolmkill, one of the Western Isles of Scotland, near that of Mull. It was formerly a bishop's see, which comprehended all the islands, together with the Isle of Man; for which reason the bishop of Man is still called bishop of Sodor and Man.

SOE. *s.* A large wooden vessel with hoops, for holding water; a cowl (*More*).

SO'EVER. *ad.* (*so* and *ever.*) A word properly joined with a pronoun or adverb, as *whosoever*; *whatsoever*; *howsoever*.

SOFA, in the east, a kind of alcove raised half a foot above the floor of a chamber or other apartment; and used as the place of state, where visitors of distinction are received. Among the Turks the whole floor of their state rooms is covered with a kind of tapestry, and on the window-side is raised a sofa or sopha, laid with a kind of mattress, covered with a carpet much richer than the other. On this carpet the Turks are seated, both men and women, like the taylors in England, cross-legged, leaning against the wall, which is bolstered with velvet, satin, or other stuff suitable to the season.

SOFA, in England, is a soft easy-chair with cushions, wide enough either to receive three or four persons sitting, or for a single person to lie upon at full length.

SOFALA, a kingdom on the E. coast of Africa, bounded on the W. and N. by the states of Mocaranga, E. by the Mozambique channel, and S. by Sabia. The extent is about 150 miles along the coast and 250 up the country. It contains rich mines of fine gold, and is tributary to the Portuguese.

SOFALA, the capital of a kingdom of the same name, with a fort built by the Portuguese, which is of great importance for their trade to the E. Indies. It is seated on a small island, near the mouth of the Cuama. Lon. 35. 40 E. Lat. 20. 22 S.

SOFIA, or SOPHIA, a city of European Turkey, capital of Bulgaria, and an archbishop's see. The trade is considerable, and the inhabitants are computed at 70,000, but the houses are meanly built. It is seated at the foot of the mountains of Argentaro, on the river Bogana, 160 miles W.N.W. of Adrianople. Lon. 23. 52 E. Lat. 43. 0 N.

SOFFITA, or SOFFIT, in architecture, any timber ceiling formed of cross beams of flying cornices, the square compartiments or pannels whereof are enriched with sculpture, painting, or gilding.

The word is Italian, and signifies the same with the Latin *lacunar* and *laquear*; with this difference, that *lacunar* is used for any ceiling with square, hollow pannels, called *lacus*; and *laquear* for compartiments interlaced with platbands, after the manner of knots or *laquei*.

Such are those we see in the basilics and palaces of Italy, in the apartments of Luxembourg, at Paris, &c.

SOFFITA, or SOFFIT, is also used for the under-side or face of an architrave; and more particularly for that of the corona or larmier, which the ancients called *lacunar*, the French *plafond*, and we usually the *drip*.

SOFT. *a.* (ropt, Sax. *saft*, Dutch.) 1. Not hard (*Bacon*). 2. Not rugged; not rough (*Matthew*). 3. Ductile; not unchangeable of form (*Milton*). 4. Facile; flexible; not resolute (*King Charles*). 5. Tender; timorous (*Pope*). 6. Mild; gentle; kind; not severe (*Milton*). 7. Meek; civil; complaisant (*Shakspeare*). 8. Placid; still; easy (*Pope*). 9. Effeminate; vitiously nice (*Davies*). 10. Delicate; elegantly tender (*Milton*). 11. Weak; simple (*Glanville*). 12. Gentle; not loud; not rough (*Dryden*). 13. Smooth; flowing (*Pope*). 14. Not forcible; not violent (*Milton*). 15. Mild; not glaring (*Brown*).

SOFT. *interj.* Hold; stop; not so fast (*Suckling*).

To SO'FTEN. *v. a.* (from *soft.*) 1. To make soft; to make less hard (*Bac.*). 2. To intenerate; to make less fierce or obstinate; to mollify (*Add.*). 3. To make easy; to compose; to make placid; to mitigate; to palliate (*Pope*). 4. To make less harsh, or vehement (*Dryden*). 5. To make less glaring. 6. To make tender; to enervate.

To SO'FTEN. *v. n.* 1. To grow less hard (*Bacon*). 2. To grow less obdurate, cruel, or obstinate (*Shakspeare*).

SO'FTLY. *ad.* (from *soft.*) 1. Without hardness. 2. Not violently; not forcibly (*Bacon*). 3. Not loudly (*Dryden*). 4. Gently; placidly (*Dryden*). 5. Mildly; tenderly (*Dryden*).

SO'FTNER. *s.* (from *soft.*) 1. That which makes soft. 2. One who palliates (*Swift*).

SO'FTNESS. *s.* (from *soft.*) 1. The quality of being soft; quality contrary to hardness (*Bacon*). 2. Mildness; kindness (*Watts*). 3. Civility; gentleness (*Dryden*). 4. Effeminacy; vitious delicacy (*Taylor*). 5. Timorousness; pusillanimity (*Grew*). 6. Quality contrary to harshness (*Bacon*). 7. Facility; gentleness; candour; easiness to be affected (*Hooker*). 8. Contrariety to energetic vehemence (*Harte*). 9. Mildness; meekness (*Waller*).

SOGNO, a town of the kingdom of Congo, in a province of the same name, which is a dry sandy country, but yields a great deal of salt. The inhabitants are said to be Christians, converted by the Portuguese, and the capuchines have a church here. It is seated on the Zaire, near its mouth, 185 miles W.S.W. of St. Salvador. Lon. 13. 15 E. Lat. 5. 50 S.

SOHAGEPOUR, a town of Hindustan Proper, capital of a district, in the province of Allahabad, 120 miles S. of Allahabad, and 230 S.W. of Patna. Lon. 82. 20 E. Lat. 23. 50 N.

SOHAM, a town in Cambridgeshire, with a market on Saturday, seated on a fen of the same name, near Soham-mere, which takes up 1000 acres of land. It is five miles S.E. of Ely, and 70 N. by E. of London. Lon. 0. 14 E. Lat. 52. 21 N.

SOHO, a village in Staffordshire, two miles N.W. of Birmingham. It was recently founded by Mr. Boulton, as a manufacture for every article common to the Birmingham trade, the plated ware usually made at Sheffield, and of elegant pieces of silver both light and massive. Here also are made the improved steam engines now adopted in numerous concerns throughout the kingdom. In 1797, an apparatus for the coinage of copper was employed here by go-

vernment; and the Bank of England dollars were also stamped at this mint; as well as some of the three shilling pieces, &c.

SOHO'. *interj.* A form of calling from a distant place.

To SOIL. *v. a.* (ȝilian, Saxon; *souiller*, French.) 1. To foul; to dirt; to pollute; to stain; to sully (*Bacon*). 2. To dung; to manure (*South*).

SOIL. *s.* (from the verb.) 1. Dirt; spot; pollution; foulness (*Shakspeare*). 2. Ground; earth, considered with relation to its vegetative qualities (*Bacon*). 3. Land; country (*Milton*). 4. Dung; compost (*Mortimer*).

SOI'LINESS. *s.* (from *soil.*) Stain; foulness (*Bacon*).

SOILING, in veterinary language, a term which denotes the feeding of cattle under cover, on recent vegetables. See FOOD.

SOI'LURE. *s.* (from *soil.*) Stain; pollution (*Shakspeare*).

To SO'JOURN. *v. n.* (*sejourner*, Fr.) To dwell any where for a time; to live as not at home; to inhabit as not in a settled habitation (*Donne*).

SO'JOURN. *s.* (*sejour*, Fr. from the verb.) A temporary residence; a casual and no settled habitation (*Milton*).

SO'JOURNER. *s.* (from *sojourn.*) A temporary dweller (*Milton*).

SOISSONNOIS, a late territory of France, in the Isle of France, which, with the late territory of Vermandois, now forms the department of Aisne. It abounds in corn, wood, and pastures.

SOISSONS, a city of France, in the department of Aisne; and anciently the capital of a kingdom of its name, under the first race of the French monarchs. It is a bishop's see; and the cathedral has one of the most considerable chapters in the kingdom. Here St. Lewis, Philip the bold, and Lewis XIV. were crowned. The castle, though ancient, is not that in which the kings of the first race resided. It is seated in a fertile valley, on the river Aisne, 30 miles W. by N. of Rheims, and 60 N.E. of Paris. Lon. 3. 19 E. Lat. 49. 23 N.

SOKE, SOK, or SOC, in our ancient law, denotes privilege or jurisdiction, and includes that of administering justice and executing laws. The word is also used for the shire, circuit, or territory, wherein such power is exercised by him endued with such jurisdiction. As the soke of Peterborough, which comprehends a certain number of villages in the neighbourhood of that city, as far as Stamford St. Martin's Baron, which are under the jurisdiction of the quarter sessions held at that city.

Hence, also, the law Latin *soca*, used for a seigniory or lordship infranchised by the king, with liberty of holding a court of his *soc-men* or *socagers*, that is, his tenants; whose tenure is hence called socage.

This kind of liberty still subsists in several parts of England, under the name of soke or soken. Skene defines soc to be *secta de hominibus suis in curia secundum consuetudinem regni*. Brady makes mention of these liberties: *soc, sac, tol, team, infangthef*, and *utfangthef*.

In the laws of Henry I. *soca* is also used as synonymous with franchise, for a privileged place, refuge, asylum, or sanctuary, &c. from the Saxon *socn*, or *socne*.

SOL, or SOU, a French coin made up of copper mixed with a little silver.

SOL, the sun, in astronomy, astrology, &c. See SUN.

SOL, in chemistry, is gold; thus called from an opinion that this metal is in a particular manner under the influence of the sun.

SOL, in heraldry, denotes *or*, the golden colour in the arms of sovereign princes.

SOL. The fifth of the six syllables invented by Guido, and applied to the notes of his gamut. The natural *sol* answers to the letter G.

To SO'LACE. *v. a.* (*solacier*, old Fr. *solazzare*, Ital. *solatium*, Latin.) To comfort; to cheer; to amuse (*Milton*).

To SO'LACE. *v. n.* To take comfort (*Shakspeare*).

SO'LACE. *s.* (*solatium*, Latin.) Comfort; pleasure; alleviation; that which gives comfort or pleasure; recreation (*Milton*).

SOLANDER (Dr. Daniel Charles), an eminent naturalist, and the pupil of Linnæus, was born in the province of Nordland, in Sweden, in 1736. He studied at Upsal, where he took his degree of M. D. In 1760 he visited England, and was prevailed on by his friend Mr. now sir Joseph Banks, to accompany captain Cook in his voyage round the world. In 1773 he was appointed one of the under librarians of the British Museum. He died of a stroke of apoplexy in 1782. He is author of a description of some petrifactions found in Hampshire, and of Observations on Natural History in Cook's Voyages, &c.

SOLANDRA, in botany, a genus of the class pentandria, order monogynia. Calyx as if broken; corol very large, funnel-form, enlarged at top; berry four-celled, many-seeded. One species only, a Jamaica shrub, climbing up the tallest trees.

SOLANUM. Nightshade. In botany, a genus of the class pentandria, order monogynia. Corol wheel-shaped; anthers slightly cohering, opening by two pores at top; berry superior, two-celled. Eighty-three species, scattered over the globe. They are thus subdivided.

A. Not armed with thorns.

B. Armed with prickles.

The following are cultivated.

1. S. lycopersicum. Tomato. Love apple. Mad apple.

2. S. Æthiopicum. Ethiopian nightshade.

3. S. melongena. Egg-plant, or large-fruited nightshade. Flowers large, blue; the fruit resembling a goose's egg, eaten when boiled.

4. S. dulcamara. Woody nightshade, or bittersweet. Found wild in our own hedges, with shrubby stem, and glabrous leaves; hairy near the sea-side.

5. S. verboscifolium. Mullein-leaved nightshade.

6. S. pseudo-capsicum. Shrubby nightshade, or winter cherry. A native of Madeira.

7. S. quercifolium. Oak-leaved nightshade.

8. S. mammosum. Dug-fruited nightshade.

9. S. Indicum. Indian nightshade.

10. S. Carolinensa. Carolina nightshade.

11. S. sodomeum. Black-spined nightshade.

12. S. sanctum. Palestine nightshade.

13. S. tuberosum. Common potatoe, or tuberose nightshade.

The dulcamara and woody nightshade have been employed medicinally: the former in decoction or infusion to promote an increased secretion of urine, sweat, the menses, and lochia; it is also employed in obstinate cutaneous diseases, and chronic rheumatism. It is the stipites or younger branches alone that are made use of for this purpose. The berries, which resemble currants, are said to be poisonous.

The garden nightshade is a poison too powerful for control when used as a medicine internally; its leaves and berries are equally deleterious, producing cardialgia and delirium, headach, drowsiness, giddiness, and loss of sight. It has nevertheless been attempted in the proportion of a grain infused in an ounce of water, in cases of scrophulous and cancerous ulcers, dropsies, and intractable cutaneous eruptions, and in conjunction with a greater or less production of the above symptoms it has been found to increase the discharge by the kidneys and intestines, and has been supposed to excite a favourable influence on the ulcerations.

The tomato, the egg plant, the potatoe, and one or two others, are well known to be pleasant and useful esculents: the potatoe is indeed an invaluable plant, and is now getting into cultivation amongst the natives of New Zealand and other islands in the South Sea instead of the yam, as affording a pleasanter and more nutritive food. See the article Husbandry.

Solanum vesicarium. The winter cherry plant is so called by Caspar Bauhin. See Alkekengi.

SO'LAR. So'lary. *a.* (*solaire*, Fr. *solaris*, Lat.) 1. Being of the sun (*Boyle*). 2. Belonging to the sun (*Brown*). 3. Born under or in the predominant influence of the sun (*Dryden*). 4. Measured by the sun (*Holder*).

SOLD. The pret. and part. pass. of *sell*.

Sold. *s.* (*souldée*, old Fr.) Military pay; warlike entertainment (*Spenser*).

SO'LDAN. *s.* (for *sultan*.) The emperour of the Turks (*Milton*).

SOLDANELLA, in botany, a genus of the class pentandria, order monogynia. Corol campanulate in many jagged segments; capsule one-celled, many-toothed at the top. One species only, an Alpine plant with nodding flowers; segments of the corol toothed; style longer than the corol; leaves kidney-form, somewhat lobed. Another variety form a diversity in the segments, style, and leaf. This plant is not unfrequently cultivated in our green-houses.

SOLDER. (*souder*, Fr. *soldare*, Ital. *solidare*, Lat.) It is sometimes written after the French *soder*, but more generally after the Latin *solder*, as above. A mineral or metallic cement, made use of in joining pieces of the same or of different metals. Solders are made of gold, silver, copper, tin, bismuth, and lead; usually observing, that in the composition there shall be some of the metal that is to be soldered mixed with some higher and finer metals. Goldsmiths usually make four kinds of solder, viz. solder of eight, where to seven parts of silver there is one of brass or copper; solder of six, where only a sixth part is copper; solder of four, and solder of three. It is the mixture of copper in the solder that makes raised plate come always cheaper than flat.

As mixtures of gold with a little copper are found to melt with less heat than pure gold itself, these mixtures serve as solders for gold: two pieces of fine gold are soldered by gold that has a small admixture of copper; and gold alloyed with copper is soldered by such as is alloyed with more copper. The workmen add a little silver as well as copper, and vary the proportions of the two to one another, so as to make the colour of the solder correspond as nearly as may be to that of the piece. A mixture of gold and copper is also a solder for fine copper as well as for fine gold. Gold being particularly disposed to unite with iron, proves an excellent solder for the finer kinds of iron and steel instruments.

The solder used by plumbers is made of two pounds of lead to one of block-tin. Its goodness is tried by melting it, and pouring the size of a crown piece on a table; for, if good, there will arise little bright shining stars in it. The solder for copper is made like that of the plumbers, only with copper and tin; and for very nice works, instead of tin, they sometimes use a quantity of silver. Solder for tin is made of two-thirds of tin and one of lead, or of equal parts of each; but where the work is any thing delicate, as in organ-pipes, where the juncture is scarcely discernible, it is made of one part of bismuth and three parts of pewter. The pewterers use a kind of solder made with two parts of tin and one of bismuth; this composition melts with the least heat of any of the solders.

Silver solder is that which is made of two parts of silver and one of brass, and used in soldering those metals. Spelter solder is made of one part of brass and two of spelter or zinc, and is used by the braziers and coppersmiths for soldering brass, copper, and iron. This solder is improved by adding to each ounce of it one pennyweight of silver; but as it does not melt without a considerable degree of heat, it cannot be used when it is inconvenient to heat the work red-hot; in which case copper and brass are soldered with silver.

Though spelter solder is much cheaper than silver solder, yet workmen in many cases prefer the latter. And Mr. Boyle informs us, that he has found it to run with so moderate a

heat, as not much to endanger the melting of the delicate parts of the work to be soldered; and if well made, this silver solder will lie even upon the ordinary kind itself; and so fill up those little cavities that may chance to be left in the first operation, which is not easily done without a solder more easily fusible than the first made use of.

To SO'LDER. *v. a.* (*souder*, Fr. *soldare*, Ital. *solidare*, Lat.) 1. To unite or fasten with any kind of metallic cement (*Newton*). 2. To mend; to unite any thing broken (*Shakspeare*).

SO'LDER. *s.* (from the verb.) Metallic cement (*Swift*).

SO'LDERER. *s.* (from *solder*.) One that solders or mends.

SOLDERING, the joining and fastening together of two pieces of the same metal, or of two different metals, by the fusion and application of some metallic composition on the extremities of the metals to be joined. To solder upon silver, brass, or iron: take silver, five pennyweights; brass, four pennyweights; melt them together for soft solder, which runs soonest. Take silver, five pennyweights; copper, three pennyweights; melt them together for hard solder. Beat the solder thin, and lay it on the place to be soldered, which must be first fitted and bound together with wire as occasion requires; then take borax in powder, and temper it like pap, and lay it upon the solder, letting it dry; then cover it with live coals, and blow, and it will run immediately; take it presently out of the fire, and it is done. It is to be observed, that if any thing is to be soldered in two places, which cannot well be done at one time, you must first solder with the harder solder, and then with the soft; for, if it is first done with the soft, it will unsolder again before the other is softened. Let it be observed, that if you would not have your solder run about the piece that is to be soldered, you must rub such places over with chalk. In the soldering either of gold, silver, copper, or either of the metals above mentioned, there is generally used borax in powder, and sometimes rosin. As to iron, it is sufficient that it be heated red-hot, and the two extremities thus hammered together, by which means they will become incorporated with each other. For the finer kinds of iron and steel instruments, however, gold proves an excellent solder. This metal will dissolve twice or thrice its weight of iron in a degree of heat very far less than that in which iron itself melts; hence if a small plate of gold is wrapped round the parts to be joined, and afterwards melted by a blowpipe, it strongly unites the pieces together without any injury to the instrument, however delicate. See SOLDER.

SO'LDIER. *s.* (*solidarius*, low Lat.) 1. A fighting man; a warrior (*Shakspeare*). 2. It is generally used of the common men, as distinct from the commanders (*Spenser*).

Such are the derivation and acceptations as given by Dr. Johnson: but we rather choose to prefer the derivation given by Dr. Delany in his valuable and learned Life of King David, vol. i. pa. 97. "Cæsar tells us that a usage anciently obtained among the Gauls, for those that were in debt, oppressed by tributes, or the tyranny of the great, to betake themselves to the service of some eminent man for protection; by him they were maintained, and to him they devoted themselves, under a solemn obligation to live and die with him. These were called, in the Gallic language, *soldurii*; which must be owned to be a very honourable original of the word soldier: for it is evident that such might be very honest and good men."

SOLDIER CRAB. See CANCER.

SOLDIER'S WOOD. See MIMOSA.

SO'LDIERLIKE. SO'LDIERLY. *a.* (*soldier* and *like*.) Martial; warlike; military; becoming a soldier (*Clarendon*).

SO'LDIERSHIP. *s.* (from *soldier*.) Military character; martial qualities; behaviour becoming a soldier; martial skill (*Shakspeare*).

SO'LDIERY. *s.* (from *soldier*.) 1. Body of military men; soldiers collectively (*Swift*). 2. Soldiership, military service (*Sidney*).

SOLE. *s.* (*solum*, Lat.) 1. The bottom of the foot (*Shakspeare*). 2. The foot (*Spenser*). 3. The bottom of the shoe (*Arbuthnot*). 4. The part of any thing that touches the ground (*Moxon*).

SOLE, in ichthyology. See PLEURONECTES.

SOLE OF A HORSE, that plate of horn which, encompassing the fleshy sole, covers the whole bottom of the foot. The sole ought to be thick and strong, and the shoe of a horse so set upon the hoof as not to bear upon it (see SHOEING); for otherwise the sole would be hurt, and not only make the horse lame, but destroy the flesh that separates it from the coffin-bone.

It has been the practice of some farriers to take out the sole. It is done without touching the outside of the hoof, for taking off the crust makes a hoof cast. A horse that has been unsoled, it is said, will recover in a month's time.

This custom of the smiths and farriers of drawing horses' soles, in order to relieve the inflammation of the part, and to promote a free perspiration, we could never perceive the least benefit accruing from; as this management leaves such a weakness and tenderness behind, that the poor creature scarcely ever after fails of labouring under an incurable lameness. Nor has La Fosse, though he has recommended the practice, produced a single instance of its success. In lieu therefore of tearing the sole up by the roots, Mr. Wood substitutes the following method, viz. in the first place, in order to take off from the tension of the vessels, and lessen the inflammation, blood must be drawn away at the toe of the horse, and above the hoof. After which, let a linseed poultice be applied. Where there is no great inflammation, the addition of a little soap to the poultice will very much assist in removing any coagulation of the blood in that quarter.

When the foot is shaped like the back part

of an oyster-shell, and the sole higher than the hoof, so that the whole foot is quite filled up on the lower part, it is called a crowned sole by farriers.

To SOLE. *v. a.* (from the noun.) To furnish with soles; as, *to* sole *a pair of shoes* (*Grew*).

SOLE. *a.* (*sol*, old French; *solus*, Lat.) 1. Single; only (*Raleigh*). 2. (In law.) Not married (*Ayliffe*).

SOLECISM, (*soloecismus*) in grammar, a gross impropriety in speech, contrary to the use of language, and the rules of grammar, either in respect of declension, conjugation, or syntax. See PURITY.

The word is Greek, σολοικισμος, derived from the Soli, a people of Attica, who, being transplanted to Cilicia, lost the purity of their ancient tongue, and became ridiculous to the Athenians for their improprieties therein.

An actor on the Roman theatre having made a false gesture, the audience immediately cried out, he had committed a solecism with his hand.

Cicero, ad Herenn. lib. iv. cap. 12. distinguishes in the following manner between barbarism and solecism. "Latinitas est quæ sermonem purum conservat, ab omni vitio remotum. Vitia in sermone, quominus is latinus sit, duo possunt esse; solecismus et barbarismus. Solecismus est, cum verbis plurimus consequens verbum superiori non accommodatur. Barbarismus est, eum verbum aliquod vitiosé effertur."

SO'LELY. *ad.* (from *sole.*) Singly; only.

SO'LEMN. *a.* (*solemnel*, Fr. *solemnis*, Lat.) 1 Anniversary; observed once a year with religious ceremonies (*Stillingfleet*). 2. Religiously grave; awful (*Milton*). 3. Formal; religiously regular (*Duty of Man*). 4. Striking with seriousness; sober (*Spenser*). 5. Grave; affectedly serious (*Swift*).

SO'LEMNESS. SOLE'MNITY. *s* (*solemnité*, Fr. from *solemn.*) 1. Ceremony or rite annually performed (*Pope*). 2. Religious ceremony. 3. Awful ceremony or procession (*Bacon*). 4. Manner of acting awfully serious (*Sidney*). 5. Gravity; steady seriousness (*Addison*). 6. Awful grandeur; grave stateliness; sober dignity (*Wotton*). 7. Affected gravity.

SOLEMNIZA'TION. *s.* (from *solemnize.*) The act of solemnizing; celebration (*Bacon*).

To SO'LEMNIZE. *v. a.* (*solemniser*, Fr.) 1. To dignify by particular formalities; to celebrate (*Hooker*). 2. To perform religiously once a year (*Hooker*).

SOLE'MNLY. *ad.* (from *solemn.*) 1. With annual religious ceremonies. 2. With formal gravity and stateliness; with affected gravity (*Dryden*). 3. With formal state (*Shakspeare*). 4. With religious seriousness (*Swift*).

SOLEN. Razor-sheath. In zoology, a genus of the class vermes, order testacea. Animal an ascidia: shell bivalve, oblong, open at both ends; hinge with a subulate, reflected tooth, often double, and not inserted in the opposite valve. Twenty-three species, scattered through the seas of the globe; seven common to those of our own coast.

These lurk in the sand near the low water-mark in a perpendicular direction, and on the approach of danger dart into the sand to the depth of one or two feet; a small dimple on the surface of the water still continuing to betray their retreat. They are occasionally taken out by the shovel; and at other times by striking a barbed dart perpendicularly into them as they appear upon the surface with their bodies protruded out of the shell in search of food. It is well known that these testaceous molluscæ are induced to desert their retreat upon salt being thrown into their holes; but the reason of this is still questionable. Some writers affirm that the salt gives them pain, and thus compels them to quit their situation; but this remark seems scarcely applicable to animals whose natural element is salt water. As an esculent the solen was known to the ancients; and Athenæus, from Sophron, speaks of it as a great delicacy: it is still frequently used as food.

SOLENA, in botany, a genus of the class pentandria, order monogynia. Calyx five-cleft, superior; corol salver-shaped, with a very long tube and hairy throat; style filiform; stigma three-cleft; berry one-celled, many-seeded. One species, a branched shrub of Guiana, with opposite, oblong entire leaves; flowers corymbed, terminal, white, nodding.

SOLENOF, a lake of Independant Tartary, 80 miles long, and 20 broad; lying midway between the Caspian sea and Lake Aral. The water is salt, and it has two islands.

SOLEURE, or SOLOTHURN, a canton of Swisserland, which stretches partly through the plain, and partly along the chains of the Jura, 36 miles in length and 25 in breadth, and is very populous. The soil, for the most part, is fertile in corn; and the districts within the Jura abound in excellent pastures. In the mountainous parts are iron, lead, alabaster, marble, and coal. It is divided into 11 bailiwics, the inhabitants of which are all Roman catholics, except those of the bailiwic of Buckeberg, who profess the reformed religion.

SOLEURE, a town of Swisserland, capital of the canton of the same name, and lately the usual residence of the French envoy to the cantons. The church of St. Urs is a noble edifice of a whitish gray stone, drawn from the neighbouring quarries, which is a species of rude marble. The arsenal, and the townhouse which has two towers, make a good appearance. Soleure is surrounded by regular fortifications, and stands in a delightful plain, on the river Aar, 18 miles N. of Bern, and 30 S.S.W. of Basel. Lon. 7. 30 E. Lat. 47. 9 N.

SOLEUS, in anatomy. See GASTROCNEMIUS INTERNUS.

SOLFAING, or SOLMIZATION, in music, the naming or pronouncing the several notes of a song by the syllables *ut*, *re*, *mi*, *fa*, *sol*, &c. in learning to sing it. Of the seven notes in the French scale, *ut*, *re*, *mi*, *fa*, *sol*, *la*, *si*, only four are used among us in singing, as *mi*, *fa*, *sol*, *la*: their office is principally, in sing-

ing, that by applying them to every note of the scale, it may not only be pronounced with more ease, but chiefly that by them the tones and semitones of the natural scale may be better marked out and distinguished. This design is obtained by the four syllables *fa, sol, la, mi.* Thus from *fa* to *sol* is a tone, also from *sol* to *la*, and from *la* to *mi*, without distinguishing the greater or less tone; but from *la* to *fa*, also from *mi* to *fa*, is only a semitone. If then these be applied in this order, *fa, sol, la, fa, sol, la, mi, fa*, &c. they express the natural series from C; and if that be repeated to a second or third octave, we see by them how to express all the different orders of tones and semitones in the diatonic scale; and still above *mi* will stand *fa, sol, la*, and below it the same inverted *la, sol, fa*, and one *mi* is always distant from another an octave; which cannot be said of any of the rest, because after *mi* ascending come always *fa, sol, la*, which are repeated invertedly descending.

To conceive the use of this, it is to be remembered, that the first thing in learning to sing, is to make one raise a scale of notes by tones and semitones to an octave, and descend again by the same; and then to rise and fall by greater intervals at a leap, as thirds and fourths, &c. and to do all this by beginning at notes of different pitch. Then those notes are represented by lines and spaces, to which these syllables are applied, and the learners taught to name each line and space thereby, which makes what we call solfaing; the use whereof is, that while they are learning to tune the degrees and intervals of sound expressed by notes on a line or space, or learning a song to which no words are applied, they may not only do it the better by means of articulate sounds, but chiefly that by knowing the degrees and intervals expressed by those syllables, they may more readily know the places of the semitones, and the true distance of the notes. Though this system of solmization does not appear to have been wholly developed in the writings of Guido, to whom the invention of the gammut and harmonical hand has been commonly ascribed, yet Dr. Burney observes, that writers very near the period in which he lived give him the honour of its discovery; and particularly Sigebert, a monk of Gemblours, in the diocese of Namur, in Brabant, in his Chronicle under the year 1028. John Cotton also, who lived about a century after Guido, says, that solmization by the six syllables *ut, re, mi, fa*, &c. was practised by the English, French, and Germans; but the Italians, he adds, made use of other syllables; and by a passage from the Chronicle of Tours, under the year 1033, cited by Carpentier, in his Supplement to the Latin Glossary of Du-Cange, art. Gamma, Guido is put in full possession of the scale and solmization. About the end of the last century the additional syllable *si* was universally received in France for the seventh of the key of C. The earliest English writer, mentioned by Dr. Burney, who takes notice of the omission of *ut* and *re* in solmization, is Mr. Charles Butler, in his Principles of Music, published in 1636, and after his time the *ut* and *re* were rejected by all the English singing-masters; Dr. Holder, Dr. Wallis, and every writer on music in this kingdom, were unanimous in excommunicating these two syllables, till Dr. Pepusch endeavoured to have them again restored.

SOLFATARA, or LAGO DI BAGNI, a lake of Italy, in Campagna di Roma, near Tivoli, formerly called Lacus Albulus. In this lake are several floating islands, formed of matted serge and herbage, with a soil of dust and sand blown from the adjacent ground, and glued together by the bitumen and sulphur with which its waters are impregnated. Some of these islands are 15 yards long, and will bear five or six people, who, by a pole, may move to different parts of the lake. From this lake issues a whitish stream, which emits vapour of a sulphureous smell, till it reaches the Teverone. The water of this rivulet has a petrifying quality, which increases in strength the further it has flowed from the lake. Fish are found in the Teverone, both above and below Tivoli, till it receives this lake; after which, during the rest of its course to the Tiber, there are none.

SOLFATARA, a mountain of Naples, in Terra di Lavoro, surrounded by other mountains, in the form of an amphitheatre. It has a kind of cavity, above a mile in diameter, which was no doubt the crater of a volcano at present extinct. The earth here is warm and white; and if opened to some depth is insupportable from the heat and exhalations. The ground is almost every where hollow, and is supposed to have a subterraneous communication with Mount Vesuvius. Here are manufactures of sulphur, vitriol, and alum.

SOLFEGGI. (Ital. Plu.) In music. Exercises for the voice according to the rules of solmization.

SOLFEGGIARE. (Ital.) To sol fa. See SOLMIZATION.

SOLFEGGIO. (Ital.) An exercise for the voice through all the various intervals as named in solmization. See SOLFEGGI.

SOLFEGGIAMENTI. (Ital. Plu.) Compositions intended as exercises, for singing at sight, and of which the syllables *do, re, mi, fa, sol, la*, form the subject.

To SOLI'CIT. *v. a.* (*solicito*, Latin.) 1. To importune; to entreat (*Milton*). 2. To call to action; to summon; to awake; to excite (*Rogers*). 3. To implore; to ask (*Sidney*). 4. To attempt; to try to obtain (*Pope*). 5. To disturb; to disquiet (*Milton*).

SOLICITATION. *s.* (from *solicit.*) 1. Importunity; act of importuning (*Milton*). 2. Invitation; excitement (*Locke*).

SOLI'CITOR. *s.* (from *solicit.*) 1. One who petitions for another (*Addison*). 2. One who does in Chancery the business which is done by attorneys in other courts.

SOLI'CITOUS. *a.* (*solicitus*, Lat.) Anxious; careful; concerned (*Clarendon*).

SOLI'CITOUSLY. *ad.* (from *solicitous.*) Anxiously; carefully (*Boyle*).

SOLI'CITUDE. *s.* (*solicitudo*, Latin.) Anxiety; carefulness (*Tillotson*).

SOLI'CITRESS. *s.* (feminine of *solicitor.*) A woman who petitions for another (*Dryden*).

SO'LID. *a.* (*solidus*, Latin; *solide*, Fr.) 1. Not liquid; not fluid (*Milton*). 2. Not hollow; full of matter; compact; dense (*Dryden*). 3. Having all the geometrical dimensions (*Arbuthnot*). 4. Strong; firm (*Addison*). 5. Sound; not weakly (*Watts*). 6. Real; not empty; true; not fallacious (*King Charles*). 7. Not light; not superficial; grave; profound (*Dryden*).

SOLID, in physics, a body whose minute parts are connected together, so as not to give way, or slip from each other, on the smallest impression. The word is used in this sense, in contradistinction to fluid.

SOLID, in geometry, is a magnitude extended in every possible direction, quite around. Though it is commonly said to be endued with three dimensions only, length, breadth, and depth or thickness.

Hence, as all bodies have these three dimensions, and nothing but bodies, solid and body are often used indiscriminately.

The extremes of solids are surfaces. That is, solids are terminated either by one surface, as a globe, or by several, either plane or curved. And from the circumstances of these, solids are distinguished into regular and irregular.

Regular solids, are those that are terminated by regular and equal planes. These are the tetraedron, hexaedron, or cube, octaedron, dodecaedron, and icosaedron; nor can there possibly be more than these five regular solids or bodies, unless perhaps the sphere or globe be considered as one of an infinite number of sides. See these articles severally, also the articles REGULAR BODY, PLATONIC, REGULAR, &c.

Irregular solids, are all such as do not come under the definition of regular ones: such as cylinder, cone, prism, pyramid, &c.

Similar solids are to one another in the triplicate ratio of their like sides, or as the cubes of the same. And all sorts of prisms, as also pyramids, are to one another in the compound ratio of their bases and altitudes.

SOLID ANGLE, is that formed by three or more plane angles meeting in a point; like an angle of a die, or the point of a diamond well cut.

Or more generally it may be defined the angular space included between several plane surfaces, or one or more curved surfaces, meeting in the point which forms the summit of the angle.

Under the word ANGLE in this work we fell into the error of all preceding geometricians, in affirming that solid angles do not admit of accurate geometrical comparison: we therefore desire to embrace this opportunity of correcting our mistake, which we can easily do by inserting a part of the disquisition on the nature and measure of solid angles given by Dr. Gregory in the third volume of Dr. Hutton's Course of Mathematics.

According to the last definition, solid angles bear just the same relation to the surfaces which comprize them, as plane angles do to the lines by which they are included: so that, as in the latter, it is not the magnitude of the lines, but their mutual inclination, which determines the angle; just so in the former it is not the magnitude of the planes, but their mutual inclinations which determine the angles. And hence all those geometers, from the time of Euclid down to the present period, who have confined their attention principally to the magnitude of the plane angles, instead of their relative positions, have never been able to develope the properties of this class of geometrical quantities; but have affirmed that no solid angle can be said to be the half or the double of another, and have spoken of the bisection and trisection of solid angles, even in the simplest cases, as impossible problems.

But all this supposed difficulty vanishes, and the doctrine of solid angles becomes simple, satisfactory, and universal in its application, by assuming spherical surfaces for their measure; just as circular arcs are assumed for the measures of plane angles.* Imagine that from the summit of a solid angle (formed by the meeting of three planes) as a centre, any sphere be described, and that those planes are produced till they cut the surface of the sphere; then will the surface of the spherical triangle, included between those planes, be a proper measure of the solid angle made by the planes at their common point of meeting: for no change can be conceived in the relative position of those planes, that is, in the magnitude of the solid angle, without a corresponding and

* It may be proper to anticipate here the only objection which can be made to this assumption; which is founded on the principle, that quantities should always be measured by quantities of the same kind. But this, often and positively as it is affirmed, is by no means necessary; nor in many cases is it possible. To measure is to compare mathematically: and if by comparing two quantities, whose ratio we know or can ascertain, with two other quantities whose ratio we wish to know, the point in question becomes determined; it signifies not at all whether the magnitudes which constitute one ratio are like or unlike the magnitudes which constitute the other ratio. It is thus that mathematicians, with perfect safety and correctness, make use of space as a measure of velocity, mass as a measure of inertia, mass and velocity conjointly as a measure of force, space as a measure of time, weight as a measure of density, expansion as a measure of heat, a certain function of planetary velocity as a measure of distance from the central body, arcs of the same circle as measures of plane angles; and it is in conformity with this general procedure that we adopt surfaces of the same sphere as measures of solid angles.

proportional mutation in the surface of the spherical triangle. If, in like manner, the three or more surfaces, which by their meeting constitute another solid angle, be produced till they cut the surface of the same or an equal sphere, whose centre coincides with the summit of the angle; the surface of the spheric triangle or polygon, included between the planes which determine the angle, will be a correct measure of that angle. And the ratio which subsists between the areas of the spheric triangles, polygons, or other surfaces thus formed, will be accurately the ratio which subsists between the solid angles, constituted by the meeting of the several planes or surfaces, at the centre of the sphere.

Hence, the comparison of solid angles becomes a matter of great ease and simplicity: for, since the areas of spherical triangles are measured by the excess of the sums of their angles each above two right angles, and the areas of spherical polygons of n sides, by the excess of the sum of their angles above $2n-4$ right angles, it follows, that the magnitude of a trilateral solid angle will be measured by the excess of the sum of the three angles, made respectively by its bounding planes, above 2 right angles; and the magnitudes of solid angles formed by n bounding planes, by the excess of the sum of the angles of inclination of the several planes above $2n-4$ right angles.

As to solid angles limited by curve surfaces, such as the angles at the vertices of cones; they will manifestly be measured by the spheric surfaces cut off by the prolongation of their bounding surfaces, in the same manner as angles determined by planes are measured by the triangles or polygons they mark out upon the same or an equal sphere. In all cases, the maximum limit of solid angles will be the plane towards which the various planes determining such angles approach, as they diverge farther from each other about the same summit; just as a right line is the maximum limit of plane angles, being formed by the two bounding lines when they make an angle of 180°. The maximum limit of solid angles is measured by the surface of a hemisphere, in like manner as the maximum limit of plane angles is measured by the arc of a semicircle. The solid right angle (either angle, for example, of a cube) is $\frac{1}{8}$ $(=\frac{1}{2^3})$ of the maximum solid angle; while the plane right angle is half the maximum plane angle.

The analogy between plane and solid angles being thus traced, we may proceed to exemplify this theory by a few instances; assuming 1000 as the numeral measure of the maximum solid angle=4 times 90° solid=360° solid.

1. The solid angles of right prisms are compared with great facility. For, of the three angles made by the three planes which, by their meeting, constitute every such solid angle, two are right angles; and the third is the same as the corresponding plane angle of the polygonal base; on which, therefore, the measure of the solid angle depends. Thus, with respect to the right prism with an equilateral triangular base, each solid angle is formed by planes which respectively make angles of 90°, 90°, and 60°. Consequently $90°+90°+60°+180°=60°$, is the measure of such angle, compared with 360° the maximum angle. It is, therefore, one sixth of the maximum angle. A right prism with a square base has, in like manner, each solid angle measured by $90°+90°+90°-180°=90°$, which is $\frac{1}{4}$ of the maximum angle. And thus it may be found, that each solid angle of a right prism, with an equilateral

triangular	base	is $\frac{1}{6}$	max. angle	$=\frac{1}{6}$. 1000.
square	——	— $\frac{1}{4}$	——	$=\frac{2}{8}$. 1000.
pentagonal	——	—	——	$=\frac{3}{10}$. 1000.
hexagonal	——	— $\frac{1}{3}$	——	$=\frac{4}{12}$. 1000.
heptagonal	——	—	——	$=\frac{5}{14}$. 1000.
octagonal	——	— $\frac{3}{8}$	——	$=\frac{6}{16}$. 1000.
nonagonal	——	—	——	$=\frac{7}{18}$. 1000.
decagonal	——	— $\frac{2}{5}$	——	$=\frac{8}{20}$. 1000.
undecagonal	——	—	——	$=\frac{9}{22}$. 1000.
duodecagonal	——	— $\frac{5}{12}$	——	$=\frac{10}{24}$. 1000.
m gonal	——	—	——	$\frac{m-2}{2m}$. 1000.

Hence it may be deduced, that each solid angle of a regular prism, with triangular base, is half each solid angle of a prism with a regular hexagonal base. Each with regular

square base	$=\frac{3}{4}$	of each, with regular octagonal base.
pentagonal base	$=\frac{4}{5}$	—— decagonal base.
hexagonal base	$=\frac{5}{6}$	—— duodecagonal base.
$\frac{1}{2}m$ gonal base	$=\frac{m-4}{m-2}$	—— m gonal base.

Hence again we may infer, that the sum of all the solid angles of any prism of triangular base, whether that base be regular or irregular, is half the sum of the solid angles of a prism of quadrangular base, regular or irregular. And the sum of the solid angles of any prism of

tetragonal base is	$=\frac{1}{2}$	sum of angles in prism of pentagonal base.
pentagonal ——	$=\frac{3}{4}$	—— hexagonal base.

hexagonal base is $= \frac{4}{3}$ sum of angles in prism of heptagonal base.

m gonal base is $= \frac{m-2}{m-1}$ ——————— $(m+1)$ gonal base.

2. Let us compare the solid angles of the five regular bodies. In these bodies, if m be the number of sides of each face; n the number of planes which meet at each solid angle; $\frac{1}{2}$ O = half the circumference or 180°; and A the plane angle made by two adjacent faces: then we have $\sin. \frac{1}{2} A = \frac{\cos \frac{1}{2n} O}{\sin \frac{1}{2m} O}$. This theorem gives, for the plane angle formed by every two contiguous faces of the tetraëdron, 70° 31′ 42″; of the hexaëdron, 90°; of the octaëdron, 109° 28′ 18″; of the dodecaëdron, 116° 33′ 54″; of the icosaëdron, 138° 11′ 23″. But in these polyedræ, the number of faces meeting about each solid angle are 3, 3, 4, 3, 5 respectively. Consequently the several solid angles will be determined by the subjoined proportions:

360° : 3.70° 31′ 42″	— 180° : : 1000 : 87·73611	Tetraëdron.
360° : 3.90°	— 180° : : 1000 : 250·	Hexaëdron.
360° : 4.109° 28′ 18″	— 360° : : 1000 : 216·35185	Octaëdron.
360° : 3.116° 33′ 54″	— 180° : : 1000 : 471·395	Dodecaëdron.
360° : 5.138° 11′ 23″	— 540° : : 1000 : 419.30169	Icosaëdron.

For more examples in illustration of this new theory, see Hutton's Course, vol. iii. pp. 90, 91.

Solids (Atmosphere of). See Atmosphere.

Solid bastion. See Bastion.

Solid of least resistance, as generally defined, is that which moving forward in a medium in the direction of its axis, will be less resisted than any other solid of the same given length and base. The determination of this problem is of course a matter of some difficulty; and it may be considered under various aspects; as, when the area of the generating plane and the greatest ordinate, are given; or, when the bulk of the solid and its greatest diameter, are given; or to search it among all the solids of equal capacity, without any other restriction; or among the solids of equal surface, &c. For solutions of these the reader may consult Horsley's Newton, vol. ii. pa. 390; Euler's Methodus Inveniendi, pa. 51; Simpson's Fluxions, pa. 487, 489, &c.; Maclaurin's Fluxions, pa. 751; Emerson's Fluxions, pa. 183, 188. 3d edit.; Lacroix's Calcul. Diff. tom. ii. p. 698; Woodhouse's Isoperimetrical Problems, pp. 115, 123, &c.

Solid numbers, are those which arise from the multiplication of a plane number, by any other whatsoever; as 18 is a solid number made of 6 (which is plane) multiplied by 3; or of 9 multiplied by 2.

Solid problem, in mathematics, is one which cannot be geometrically solved unless by the intersection of a circle and a conic section, or by the intersection of two other conic sections, besides the circle. As to describe an isosceles triangle on a given right line, whose angle at the base shall be triple to that at the vertex. This will help to inscribe a regular heptagon in a given circle; and may be resolved by the intersection of a parabola, and a circle. This problem also helps to inscribe a nonagon in a circle, and may be solved by the intersection of a parabola, and an hyperbola between its asymptotes, viz. to describe an isosceles triangle, whose angle at the base shall be quadruple of that at the vertex. And such a problem as this hath four solutions, and no more; because two conic sections can cut one another but in four points.

SOLIDAGO. Golden-rod. In botany, a genus of the class syngenesia, order polygamia superflua. Receptacle cellular, naked; down simple; florets of the margin from five to ten; calyx imbricate, closed. Thirty-eight species, with a few exceptions, natives of North America; one only, S. virgaurea, common to our own woods. They are thus subdivided.

A. Arborescent, including two species only.

B. Herbaceous; racemes pointing one way; leaves triply nerved, including seven species.

C. Racemes pointing one way; leaves veined: including twelve species.

D. Racemes erect; including the rest.

The following are cultivated.

1. S. virgaurea. Common golden-rod. A native of Europe and Japan, and, as we have already observed, indigenous to our own country: sometimes denominated Aaron's-rod, and wound-wort: and in the dispensatories consolida Saracenica, herba dorea, and Virga aurea; to which last name we refer our readers for its medical virtues.

2. S. Canadensis. Canadian golden-rod.

3. S. altissima. Tall golden-rod.

4. S. Mexicana. Mexican golden-rod.

5. S. viminea. Twiggy golden-rod.

6. S. bicolor. Two-coloured golden-rod.

7. S. rigida. Hard-leaved golden-rod.

8. S. cœsia. Maryland golden-rod.

9. S. flexicaulis. Crooked-stalked golden-rod.

10. S. sempervirens. Narrow-leaved evergreen golden-rod.

These are all readily increased by slipping or parting the roots, and planting them out in the autumn, or winter soon after their stems decay, or very early in the spring before they begin to shoot.

SOLIDITY, in physics, a property of matter or body, whereby it excludes every other body from that place which itself possesses.

Solidity, in this sense, is a property common to all bodies, whether solid or fluid. It is usually called impenetrability; but solidity expresses it best, as carrying somewhat more of positive with it than the other, which is a negative idea.

The idea of solidity, Mr. Locke observes, arises from the resistance we find one body make to the entrance of another into its own place. Solidity, he adds, seems the most extensive property of body, as being that whereby we conceive it to fill space; it is distinguished from mere space, by this latter not being capable of resistance or motion.

It is distinguished from hardness, which is only a firm cohesion of the solid parts, so as they may not easily change their situation.

The difficulty of changing situation gives no more solidity to the hardest body than to the softest; nor is a diamond properly a jot more solid than water. By this we distinguish the idea of the extension of body, from that of the extension of space: that of body is the continuity or cohesion of solid, separable, moveable parts; that of space the continuity of unsolid, inseparable, immoveable parts. See MATTER.

SOLIDITY is also used for hardness, or firmness; as opposed to fluidity; viz. when body is considered either as fluid or solid, or hard or firm.

SOLIDITY, in geometry, denotes the quantity of space contained in a solid body, or occupied by it; called also the solid content, or the cubical content; for all solids are measured by cubes, whose sides are inches, or feet, or yards, &c.; and hence the solidity of a body is said to be so many cubic inches, feet, yards, &c. as will fill its capacity or space, or another of an equal magnitude.

The solidity of a cube, parallelopipedon, cylinder, or any other prismatic body, i. e. one whose parallel sections are all equal and similar throughout, is found by multiplying the base by the height or perpendicular altitude. And of any cone or other pyramid, the solidity is equal to one-third part of the same prism, because any pyramid is equal to the 3d part of its circumscribing prism. Also, because a sphere or globe may be considered as made up of an infinite number of pyramids, whose bases form the surface of the globe, and their vertices all meet in the centre, or having their common altitude equal to the radius of the globe; therefore the solid content of it is equal to one-third part of the product of its radius and surface. For the solidity of other figures, see each figure separately.

The foregoing rules are such as are derived from common geometry. But there are in nature numberless other forms, which require the aid of other methods and principles, as follows.

Of the solidity of bodies formed by a plane revolving about any axis, either within or without the body.—Concerning such bodies, there is a remarkable property or relation between their solidity and the path or line described by the centre of gravity of the revolving plane, viz. the solidity of the body generated, whether by a whole revolution, or only a part of one, is always equal to the product arising from the generating plane drawn into the path or line described by its centre of gravity, during its motion in describing the body. And this rule holds true for figures generated by all sorts of motion whatever, whether rotatory, or direct, or parallel, or irregularly zigzag, &c. provided the generating plane vary not, but continue the same throughout. And the same law holds true also for all surfaces any how generated by the motion of a right line. This is called the Centrobaric method. See Hutton's Mensuration, sect. 3, part 4, pa. 504, 2d edit. and Gregory's Mechanics, vol. i. pa. 64, &c.

Of the solidity of bodies by the method of fluxions.—This method applies very advantageously in all cases also in which a body is conceived to be generated by the revolution of a plane figure about an axis, or, which is much the same thing, by the parallel motion of a circle, gradually expanding and contracting itself, according to the nature of the generating plane. And this method is particularly useful for the solids generated by any curvilineal plane figures. In these cases the area of the variable or expanding circle drawn into the fluxion of the axis will produce the fluxion of the solid. Hence, if the abscissa $=x$, the semi-ordinate $=y$, and $\pi=3{\cdot}1416$, then because πy^2 is equal to the area of the circle in the assumed state where the radius $=y$, we have $\pi y^2\dot{x} =$ the fluxion of the solid. And consequently, if from the given equation of the curve, the value of either y^2 or $\dot{x}$ be found, and that value substituted for it in the expression $\pi y^2\dot{x}$, the fluent of the resulting quantity being taken will be the solidity or capacity of the figure proposed.

For an example let the solid be that which would be generated by the revolution of any parabola about its axis. Here the general equation $ax = y^n$: whence $\dot{x} = -\frac{ny^{n+1}\dot{y}}{n}$. Consequently $\frac{\pi y^2\dot{x}}{a} = -\frac{n\pi y^{n+1}\dot{y}}{a}$; the fluent of which is $\frac{n^{\pi y^{n+2}}}{(n+2)\,a} + C$ (the correction) $=$ $\frac{n}{n+2}\cdot\pi y^2\cdot\frac{y^n}{a} + C = \frac{n}{n+2}\cdot\pi y^2x + C$. But when $x=0$, the capacity $=0$, therefore $C=0$. Hence the entire fluent is $\frac{n}{n+2}\cdot\pi y^2x$, for the capacity required.

If $n=2$, the solid is the common paraboloid, and the expression for the capacity is $= \frac{1}{2}\pi y^2x$ $=\frac{1}{2}$ content of circumscribing cylinder.

If $n=1$, the curve becomes a straight line and the solid a cone, its content being $\frac{1}{3}\pi y^2x =$ $\frac{1}{3}$ of the circumscribing cylinder.

See the treatises on fluxions by Simpson, Emerson, Vince, Dealtry, &c.

SO'LIDLY. *ad.* (from *solid.*) 1. Firmly; densely; compactly. 2. Truly; on good ground (*Digby*).

SO'LIDNESS. *s.* (from *solid.*) Solidity; firmness; density (*Howel*).

SOLIDU'NGULOUS. *a.* (*solidus* and *ungula*, Lat.) Whole-hoofed (*Brown*).

SOLIFI'DIAN. *s.* (*solus* and *fides*, Latin.) One who supposes only faith, not works, necessary to justification (*Hammond*).

SOLIHULL, a town in Warwickshire, with a market on Wednesday, 12 miles W. of Coventry, and 108 N.W. of London.

SOLI'LOQUY. *s.* (*soliloque*, French; *solus* and *loquor*, Latin.) A discourse made by one in solitude to himself (*Prior*).

SO'LIPEDE. *s.* (*solus* and *pedes*, Lat.) An animal whose feet are not cloven (*Brown*).

SOLITA'IRE. *s.* (*solitaire*, French.) 1. A recluse; a hermit (*Pope*). 2. An ornament for the neck.

SO'LITARILY. *ad.* (from *solitary.*) In solitude; with loneliness; without company.

SO'LITARINESS. *s.* (from *solitary.*) Solitude; forbearance of company; habitual retirement (*Donne*).

SO'LITARY. *a.* (*solitaire*, Fr. *solitarius*, Latin.) 1. Living alone; not having company (*Milton*). 2. Retired; remote from company (*Shakspeare*). 3. Gloomy; dismal (*Job*). 4. Single (*Brown*).

SO'LITARY. *s.* (from the adjective.) One that lives alone; a hermit (*Pope*).

SO'LITUDE. *s.* (*solitude*, Fr. *solitudo*, Latin.) 1. Lonely life; state of being alone (*Bacon*). 2. Loneliness; remoteness from company (*Law*). 3. A lonely place; a desert.

SOLKAMSK, a town of Russia, in the government of Perm, famous for its salt-pits and good horses. It is seated on the Ussolka, which flows into the Kama, 430 miles N.E. of Kasan. Lon. 57. 26 E. Lat. 59. 16 N.

SOLMIZATION. See SOLFAING.

SOLMS, a county of Germany, in Wetteravia, lying W. of Upper Hesse. The house of Solms is divided into several branches; the principal one is Braunfels, which was raised to the princely rank in 1742. The decayed castle of Solms, the seat of the ancient counts, is seated on a hill, one mile E. of Braunfels, the present capital.

SOLNUS (C. Julius), a grammarian at the end of the first century, who wrote a book called Polyhistor, which is a collection of historical remarks and geographical annotations on the most celebrated places of every country. He has been called Pliny's ape, because he imitated that well known naturalist.

SOLO, in the Italian music, is frequently used in pieces consisting of several parts, to mark those that are to perform alone; as *flauto solo*, *violino solo*. It is also used for sonatas composed for one violin, one German flute, or other instrument, and a bass; thus we say, Corelli's solos, Geminiani's solos, &c. When two or three parts play or sing separately from the grand chorus, they are called a *doi soli*, a *tre soli*, &c. Solo is sometimes denoted by S.

SOLOMON, the son of David king of Israel, renowned in Scripture for his wisdom, riches, and magnificent temple and other buildings. Towards the end of his life he sullied all his former glory by his apostacy from God; for which cause vengeance was denounced against his house and nation. He died about 975 B. C.

SOLOMON'S SEAL, in botany. See CONVALLARIA.

SOLOMON'S SONG. See CANTICLES.

SOLON, one of the seven sages of Greece, was born in the year 638 B. C. He was a native of Salamis, the son of Execestidas, and reputed to be a descendant of Codrus. By his mother's side he was related to the tyrant Pisistratus. In his youth he was engaged in commercial enterprizes, and prompted both by a liberal curiosity and the desire of gain, visited many foreign regions. It is probable that he retired at an early period from his mercantile pursuits, when he gave himself up to the studies of poetry, philosophy, and politics. A circumstance which exemplifies at once his patriotism, his prudence, and his poetical powers, is mentioned by historians. The Athenians, wearied with an unsuccessful war which they had long waged with the Megarensians for the recovery of the island of Salamis, passed a law, prohibiting any one, under penalty of death, from proposing the further prosecution of the contest. Solon, feeling deeply for the disgrace of his city, and persuaded that others were actuated by similar sentiments, feigned himself mad, and ascending to the public station of the herald, recited in presence of the people an elegy, deploring the loss of Salamis, and the degradation of Athens. Animated by the sentiments which he expressed, the Athenians rescinded their former decree, and committed the prosecution of their claim by a renewal of the war to Solon, by whom it was successfully maintained. The poem of Solon, consisting of a hundred verses, was extant in the time of Plutarch, who speaks highly of its merit.

By the influence of Solon a league was formed among the states of Greece, to protect the temple of Delphi from the insults and exactions of the Cirrhæans, the object of which was accomplished, and the territory of the offenders devoted to perpetual execration. (Æschin. cont. Ctes.)

In the third year of the forty-sixth Olympiad, Solon was appointed Archon, and was invested with authority to compose the dissensions which prevailed between the different orders of the state, and threatened the most dangerous consequences. The care of forming a new constitution for the future government of the republic was likewise intrusted to him.

in the discharge of this office he appeased the civil disorders by which the state was convulsed; he abrogated the severe and bloody laws of Draco, with the exception of those which related to murder; he diminished the power of the creditor over the debtor, distributed the people into classes, and introduced various important changes into the form of government. Having completed the work of legislation, and finding himself harassed by the frequent applications of persons who wished to consult him respecting the meaning of his laws, or to suggest amendments, which we may suppose were in many instances wholly foreign to their spirit, in order to relieve himself from their importunities, and to insure the permanency of his institutions, he resolved to travel, having bound the Athenians by a solemn oath, to suffer no infringement of his laws. He first proceeded to Egypt, where he conversed with the priests of Heliopolis and Sais, and was instructed in the secrets of their philosophy. He afterwards visited the court of Cræsus, king of Lydia, with whom he held that celebrated conversation respecting happiness, which is related by Herodotus and other writers. Some chronological difficulties have been supposed to impeach the credibility of this discourse, but it seems to admit of a satisfactory defence.

During the absence of Solon, the factions which had before agitated the state broke forth afresh; he therefore returned to Athens, hoping by his presence to restore tranquillity. He was received with distinguished honour, but Pisistratus soon after, by his artful machinations, made his way to sovereign power, and though he ruled with moderation, and treated Solon with regard and deference, the latter retired to Cyprus, where he died at the age of eighty. His body was brought back to Salamis, his native island, and there buried. Statues were erected to his memory.

Solon was one of those early Greek philosophers who were distinguished by the appellation of the seven wise men. Philosophy had in that age attained to no systematic cultivation, and the only monuments of the wisdom of most of those ancient sages which have descended to us, are some short moral and prudential apophthegms, which seem to require for their discovery little depth of penetration, or extent of observation. They have, however, been consecrated to perpetual remembrance by the gratitude and admiration of Greece.

That the laws of Solon might be open to the inspection of the people, they were inscribed on wooden tablets, turning on axes, and said to have been of different forms, as the laws which they contained related to private or public affairs. The mode of writing is that which is termed βουστροφηδον, of which an instance remains in the celebrated Sigean inscription, proceeding alternately from left to right, and right to left.

The fragments of Solon's laws have been collected by various writers, and with most care by Samuel Petit in a learned work, which is, however, by no means free from inaccuracies and unfortunate conjectures, under the title, Leges Atticæ, Par. 1635, fol. This work was republished by Wesseling with many improvements, and the addition of his own remarks and those of other critics, Lugd. Bat. 1742. Diogenes Laertius to his life of Solon has annexed four epistles, which he ascribes to that philosopher, addressed to Periander, Epimenides, Pisistratus, and Cræsus.

Of the poetical talents of Solon time has left us little opportunity of judging. Thirty-one fragments collected from Stobæus and other writers, are printed by Brunck. They are written in various measures, but chiefly the elegiac. Many of them, in a style resembling that of Theognis, are employed in the illustration of useful maxims relative to the conduct of life and formation of manners. The scanty fragments of the Salaminian elegy manifest considerable animation, not inadequate to the powerful effect which it is said to have produced.

SOLSTICE, in astronomy, that time when the sun is in one of the solstitial points; that is, when he is at his greatest distance from the equator; thus called because he then appears to stand still, and not to change his distance from the equator for some time; an appearance owing to the obliquity of our sphere, and which those living under the equator are strangers to. The solstices are two in each year; the æstival or summer solstice, and the hyemal or winter solstice. The summer solstice is when the sun seems to describe the tropic of cancer, which is about June 21 or 22, when he makes the longest day: the winter solstice is when the sun enters the first degree, or seems to describe the tropic of capricorn, which is about December 21 or 22, when he makes the shortest day. This is to be understood as in our northern hemisphere; for, in the southern, the sun's entrance into capricorn makes the summer solstice, and that into cancer the winter solstice. The two points of the ecliptic, wherein the sun's greatest ascent above the equator, and his descent below it, are terminated, are called the solstitial points; and a circle, supposed to pass through the poles of the world and these points, is called the solstitial colure. The summer solstitial point is in the beginning of the first degree of cancer, and is called the æstival or summer point; and the winter solstitial point is in the beginning of the first degree of capricorn, and is called the winter point. These two points are diametrically opposite to each other.

SOLSTI'TIAL. *a.* (from *solstice.*) 1. Belonging to the solstice (*Brown*). 2. Happening at the solstice (*Philips*).

SO'LUBLE. *a.* (*solubilis*, Latin.) Capable of dissolution or separation of parts (*Arbuthnot*).

SOLUBI'LITY. *s.* (from *soluble.*) Susceptiveness of separation of parts (*Glanville*).

To SOLVE. *v. a.* (*solvo*, Latin.) To clear; to explain; to untie an intellectual knot.

SO'LVENCY. *s.* (from *solvent.*) Ability to pay.

SO'LVENT. *a.* (*solvens*, Latin.) 1. Having the power to cause dissolution (*Boyle*). 2. Able to pay debt contracted.

SO'LVIBLE. *a.* (from *solve.*) Possible to be cleared by reason or inquiry (*Hale*).

SOLUTIO CONTINUI, or SOLUTION OF CONTINUITY, a term used by physicians, &c. to express a disorder common to the solid parts of the body, wherein their natural cohesion is separated: as by a wound or other cause.

If this happen to a simple, similar part of the body, it is called simply solutio continui. If to a compound, or organical part, it acquires a particular denomination, from the nature of the part, the difference of the cause, or the manner of application; as, a wound, rupture, fracture, puncture, fissure, contusion, ulcer, corrosion, dilaceration, exfoliation, caries, &c.

SOLUTION, SOLUTIO, in algebra and geometry, is the answering of a question; or resolving any problem proposed. See RESOLUTION and REDUCTION OF EQUATIONS. The solution of the problem of the quadrature of the circle, and that of the duplicature of the cube, by right lines, are held impossible.

SOLUTION OF CONTINUITY, in surgery. See SOLUTIO CONTINUI.

SOLUTION, in physics, the reduction of a solid, or firm body, into a fluid state, by means of some menstruum.

Solution is frequently confounded with what we otherwise call dissolution, but there is a difference.

SOLU'TION. *s.* (*solutio*, Latin.) 1. Disruption; breach; disjunction; separation (*Bac.*). 2. Matter dissolved; that which contains any thing dissolved (*Arbuthnot*). 3. Resolution of a doubt; removal of an intellectual difficulty (*Milton*).

SOLUTION (Chemical). An intimate commixture of solid bodies with fluids, into one seemingly homogeneous liquor. The dissolving fluid is called a menstruum or solvent.

Objections have been made, and perhaps with propriety, to these names, as it is supposed that the two bodies uniting in solution act reciprocally on each other; there is, however, no danger from the words themselves, if we derive none from a mistaken theory. Solution cannot take place unless one of the bodies at least be in a fluid state; and this fluidity is affected either by water or fire: hence solution is said be performed in the humid or in the dry way. Thus, for instance, if any quantity of brimstone be dissolved in a solution of fixed alkali, the brimstone is said to be dissolved in the humid way; but if the brimstone be dissolved by melting it with the dry alkali, the solution is said to be done in the dry way. The compound produced by this mixture is called hepar sulphuris, and the same in both. Another kind of solution resembling that by the dry way is, however, to be carefully distinguished from it. If, for example, a piece of Glauber salt is put into a pan over a fire, the salt very soon assumes a liquid state; but on continuing the heat, it loses its fluidity, and becomes a white powder; this powder is the salt freed from its water, and is found to be very refractory. This liquidity on the water of crystallization being enabled by the heat to keep the salt in solution, and the salt ceased to be fluid as soon as its crystallizing water is evaporated. This kind of solution, which is sometimes called the watery fusion, differs not from the first or humid way.

The principal menstrua used in pharmacy are, water, vinous spirits, oils, acids, and alkaline liquors.

Water is the menstruum of all salts, vegetable gums, and animal jellies. Of salts it dissolves only a determinate quantity, though of one kind of salt more than another; and being thus saturated, leaves an additional quantity of the same salt untouched.

Experiments have been made for determining the quantities of water which different salts require for dissolution. Mr. Eller has given a large set in the memoirs of the Royal Academy of Sciences of Berlin, for the year 1750, from which the following table is extracted:

Eight ounces by weight of distilled water dissolved,

	oz.	dr.	gr.
Of Refined sugar	24	0	0
Green vitriol	9	4	0
Blue vitriol	9	0	0
White vitriol	4	4	0
Epsom salt	4	0	0
Purified nitre	4	0	0
Soluble tartar	4	0	0
Common salt	3	4	0
Sal gemmæ	3	4	0
Sal catharticus Glauberi	3	4	0
Seignettes salt	3	0	0
Alum	2	4	0
Sal ammonia	2	4	0
Vitriolated tartar	1	4	0
Salt of hartshorn	1	4	0
Sugar of lead	1	2	0
Cream of tartar	1	0	0
Borax	0	4	20

Though these experiments appear to have been made with great care, yet the proportions of the several salts, soluble in a certain quantity of water, will not always be found exactly the same with those above set down. Salts differ in their solubility according to the degree of their purity, perfection, and dryness; the vitriols, and the artificial compound salts in general, differ remarkably in this respect, according as they are more or less impregnated with the acid ingredient. Thus, vitriolated tartar, perfectly neutralized, is extremely difficult of solution; the matter which remains on making nitrous acid, is no other than a vitriolated tartar; and it dissolves so difficultly that the operator is obliged to break the retort in order to get it out; but on adding more of the

vitriolic acid it resolves with ease. Hence many have been tempted to use an over-proportion of acid in this preparation; and we frequently find this acrid soluble salt in the shops, and under the name of vitriolated tartar. The degree of heat occasions also a remarkable difference in the quantity of salt taken up; in very cold weather, eight ounces of water will dissolve only one ounce of nitre, whereas in warm weather the same quantity will take up four ounces. To these circumstances are probably owing, in part, the remarkable difference in the proportional solubilities of salts, as determined by different authors. It is observable, that common salt is less affected in its solubility by a variation of heat than any other; water in a temperate state, dissolving nearly as much of it as very hot water; and accordingly this is the salt in which the different experiments agree the best. In the experiments of Hoffmann, Newmann, and Petit, the proportion of this salt, on a reduction of the numbers, come out exactly the same, viz. three ounces of salt to eight of water; Dr. Brownrigg makes the quantity of salt a little more; Dr. Grew, a drachm and a scruple more; and Eller, as appears in the above table, four drachms more: so that in the trials of six different persons made probably in different circumstances, the greatest difference is only one-sixth of the usual quantity of salt: whereas in some other salts there are differences of twice or thrice the quantity of salt. In the experiments from which the table is drawn, the water was of the temperature of between 40 and 42 degrees of Fahrenheit's thermometer.

Some salts omitted by Eller are here subjoined; the first is taken from Dr. Grew, and the other four from Newmann.

Eight ounces of water dissolved,

	oz.	dr.	gr.
Of Fixed alkaline salt	8	0	0
Sal diureticus	8	0	0
Sugar candy, both brown and white	9	0	0
Sugar of milk	0	2	40
Essential salt of sorrel	0	1	20

Though water takes up only a certain quantity of one kind of salt, yet when saturated with one, it will still dissolve some portion of another; and when it can bear no more of either of these, it will still take up a third, without letting go any of the former. The principal experiments of this kind, which have been made relative to pharmaceutic subjects, are exhibited in the following table, of which the first two articles are from Grew, and the others from Eller:

Water, 32 parts by weight,

Fully saturated with	dissolved afterwards			
Nitre,	Sal ammoniac	10	Sal ammonia	2
Common salt,	Nitre	10	Common salt	2
Nitre,	Fixed alkali	7	Fixed alkali	2
Common alkali,	Nitre, near	2	Sugar	2
Volatile alkali,	Nitre	4		
Sal ammoniac,	Common salt	2½		
Volatile tartar,	Nitre	2		
Vitriolated tartar,	Fixed alkali	2		
Glauber's salt,	Nitre	1	Sugar	1
Epsom salt,	Sugar	6		
Borax,	Fixed alkali	2		

In regard to the other class of bodies for which water is a menstruum, viz. those of the gummy and gelatinous kind, there is no determinate point of saturation, the water unites readily with any proportion of them, forming with different quantities liquors of different consistence. This fluid takes up likewise, when assisted by trituration, the vegetable gummy resins, as ammoniacum and myrrh; the solutions of which, though imperfect, that is, not transparent, but turbid and of a milky hue, are nevertheless applicable to valuable purposes in medicine. It mixes with vinous spirits, with acid and alkaline liquors, not with oils, but imbibes some of the more subtile parts of essential oils, so as to become impregnated with their smell and taste.

Rectified spirit of wine, or rather alkohol, is the menstruum of the essential oils and resins of vegetables, of the pure distilled oils, and several of the colouring and medicinal parts of animals; of some mineral bituminous substances, as of ambergris; and of soaps, though it does not act upon the expressed oils and fixed alkaline salts, of which soap is composed, whence if soap contains any superfluous quantity of either the oil or the salt, it may by means of this menstruum be excellently purified. It dissolves, by the assistance of heat, volatile alkaline salts, and more readily the neutral ones, composed either of fixed alkali and the acetous acid, as the sal diureticus, or of the volatile alkali and nitrous acid, as also the salt of amber, &c. It mixes with water and with acid, not with alkaline lixivia.

Oils dissolve vegetable resins and balsams, wax, animal salts, mineral bitumens, sulphur, and certain metallic substances, particularly lead. The expressed oils are, for most of these bodies, more powerful menstrua than those obtained by distillation, as the former are more capable of sustaining without injury a strong heat, which is in most cases necessary to enable them to act. It is said that one ounce of sul-

phur will dissolve in three ounces of expressed oil, particularly linseed oil, but requires six ounces of essential oil, as turpentine.

All acids dissolve alkaline salts, alkaline earths, and metallic substances. The different acids differ greatly in their action on the last, one dissolving only some particular metals; and another, others.

The vegetable acids dissolve a considerable quantity of zinc, iron, copper, lead, and tin; and extract so much from the metallic part of antimony, as to become powerfully emetic. They dissolve lead more readily, if the metal be previously calcined by fire, than in its metallic state.

The muriatic acid dissolves zinc, iron, and copper, and though it acts scarcely on any other metallic substance in the common way of making solutions, it may nevertheless be artfully combined with them all. The corrosive sublimate and antimonial caustic of the shops are combinations of it with mercury and the metallic part of antimony, effected by applying the acid, in the form of fume, to the subjects at the same time also strongly heated.

The nitrous acid is the common menstruum of all metallic substances, except gold and the metallic part of antimony, of which two, the proper solvent is a mixture of the nitrous and muriatic, called aqua regia.

The vitriolic acid diluted with water, easily dissolves zinc and iron. In its concentrated state, and assisted by a boiling heat, it may be made to corrode, or imperfectly dissolve most of the other metals. Fixed air or aërial acid dissolves iron, zinc, and calcareous earth; and these solutions must be conducted without heat. Alkaline lixivia dissolve oils, resinous substances, and sulphur. Their power is greatly promoted by the addition of quicklime, instances of which occur in the preparation of soap, and in the common caustic. Thus actuated, they reduce the flesh, bones, and other solid parts of animals, into a gelatinous matter.

This increased acrimony in alkaline salts is owing to the abstraction of their fixed air, that acid having a greater attraction for quicklime than for alkalies.

Solutions made in water and in spirit of wine possess the virtues of the bodies dissolved, while oils generally sheath its activity, and acids and alkalies vary its quality. Hence watery and spirituous liquors are the proper menstrua of the native virtues of vegetable and animal matters.

Most of the foregoing solutions are easily affected, by pouring the menstruum on the body to be dissolved, and suffering them to stand together for some time exposed to a suitable heat. A strong heat is generally requisite to enable oils and alkaline liquors to perform their office; nor will acids act on some metallic bodies without its assistance. The action of watery and spirituous menstrua is likewise expedited by a moderate heat; though the quantity which they afterwards keep dissolved is not, as some suppose, by this means increased; all that heat occasions these to take up more than they would do in a longer time in the cold, will, when the heat ceases, subside again. This at least is most commonly the case, though there may be some instances of the contrary.

The action of acids on the bodies which they dissolve is generally accompanied with heat, effervescence, and a copious discharge of elastic aërial fluids, different in different cases.

There is another species of solution, in which the moisture of the air is the menstruum. Fixed alkaline salts, and those of the neutral kind, composed of alkaline salts and the vegetable acid, or of soluble earths and any acid except the vitriolic, and some metallic salts, on being exposed to a moist air, gradually attract humidity, and at length become liquid. Some substances, not dissoluble by the application of water in its grosser form, as the butter of antimony, are easily liquified by the slow action of the aërial moisture. This process is called deliquation.

SO'LUTIVE. *a.* (from *solvo*, Latin.) Laxative; causing relaxation (*Bacon*).

SOLWAY FRITH, an arm of the sea, between Cumberland in England, and Dumfriesshire and Kirkcudbrightshire in Scotland. It is navigable for vessels of 100 tons within six miles of its extremity; and the fisheries, especially of salmon, are very considerable.

SOLWAY MOSS, a black morass in Cumberland, near the river Esk, on the borders of Scotland, which, in 1771, being swoln by rains, burst through the shell of turf which covered it, and spread an inky half-fluid deluge over 400 acres of cultivated land in the neighbouring valley, which it entirely filled up.

SOMATO'LOGY. *s.* (σωμα and λεγω.) The doctrine of bodies.

SOMBRERE, an island in the Indian Ocean, 30 miles N. of Nicobar. The inhabitants are mild, timorous, and very obliging to strangers.

SOMBRERO, a cluster of uninhabited islands in the West Indies, belonging to the English. The most remarkable of them is a league long, and consists of an eminence, to which the Spanish discoverers, finding some resemblance to a hat, gave the name of Sombrero. It is 80 miles N.W. of St. Christopher. Lon. 63. 37 W. Lat. 18. 38 N.

SOME. A termination of many adjectives, which denote quality or property of any thing; as *gamesome*. (*saam*, Dutch.)

SOME. *a.* (rom, rum, Saxon.) 1. More or less, noting an indeterminate quantity (*Ral.*). 2. More or fewer, noting an indeterminate number (*Bacon*). 3. Certain persons. *Some* is often used absolutely for some people; part (*Daniel*). 4. *Some* is opposed to *same*, or to *others* (*Spenser*). 5. It is added to a number, to show that the number is uncertain and conjectural (*Bacon*). 6. One; any, without determining which (*Milton*).

SO'MEBODY. *s.* (*some* and *body*.) 1. One; not nobody; a person indiscriminate and undetermined (*Bacon*). 2. A person of consideration (*Acts*).

SO'MEDEAL. *ad.* (ꝑumꝺeal, Saxon.) In some degree: obsolete (*Spenser*).

SO'MEHOW. *a.* (*some* and *how*.) One way or other; I know not how (*Cheyne*).

SOMERS (John), lord high chancellor of England, was born at Worcester, in 1652. He was educated at Oxford, and afterwards entered himself at the Middle Temple, where he studied the law with great vigour. In 1688 he was one of the counsel for the seven bishops at their trial, and argued with great learning and eloquence against the dispensing power. In the convention which met by the prince of Orange's summons, January 22, 1689, he represented Worcester; and was one of the managers for the House of Commons, at a conference with the House of Lords upon the word *abdicated*. Soon after the accession of king William and queen Mary to the throne, he was appointed solicitor-general, and received the honour of knighthood. In 1692 he was made attorney-general, and in 1693 advanced to the post of lord keeper of the great seal of England. In 1695 he proposed an expedient to prevent the practice of clipping the coin. In 1697 he was created lord Somers, baron of Evesham, and made lord high chancellor of England. In the beginning of 1700 he was removed from his post of lord chancellor, and the year after was impeached of high crimes and misdemeanors by the House of Commons, of which he was acquitted upon trial by the House of Lords. He then retired to a studious course of life, and was chosen president of the Royal Society. In 1706 he proposed a bill for the regulation of the law; and the same year was one of the principal managers for the union between England and Scotland. In 1708 he was made lord president of the council; from which post he was removed in 1710, upon the change of the ministry. In the latter end of queen Anne's reign his lordship grew very infirm in his health, which is supposed to be the reason that he held no other post than a seat at the council-table after the accession of king George I. He died of an apoplectic fit in 1716. Mr. Addison has drawn his character very beautifully in the Freeholder.

SO'MERSAULT. So'MERSET. *s.* (*sommer*, a beam, and *sault*, French, a leap.) A leap by which a jumper throws himself from a height, and turns over his head.

SOMERSETSHIRE, a county of England, 65 miles long and 45 broad; bounded on the N.W. by the Bristol Channel, on the N. by Gloucestershire, on the E. by Wiltshire, on the S.E. by Dorsetshire, and on the S.W. by Devonshire. It lies in the dioceses of Bristol and of Bath and Wells; contains 42 hundreds, three cities, 31 market-towns, and 385 parishes; and sends 18 members to parliament. The air in the lower grounds is universally mild, and generally wholesome. The soil in the N.E. quarter is in general stony, and possesses a lofty mineral tract, called the Mendip Hills. Towards the centre, where its principal rivers unite, are fens and marshy moors of great extent. On the W. side are the Quantock Hills, with many downs and open heaths; and in the N.W. corner is the black sterile region of Exmoor. The S. part, toward Dorsetshire, is high, but well cultivated; and throughout the county, especially in its S.W. quarter, vales of the greatest fertility are interspersed. The principal rivers are the Parret, Ivel, Thone, Brent, and Avon. The Mendip Hills afford abundance of coal, lead, calamine, copper, manganese, bole, and red ochre. Cattle, nearly equal in size to the Lincolnshire, are fed in fine meadows about the head of the Parret. The best goose feathers for beds come from the marshes. Cider is a common product of this county, and it has a considerable share in the woollen manufactures. Bristol is the capital of this county with respect to size, population, and commerce; but Bath is the great place of resort for health and pleasure. Somersetshire contained 273,750 inhabitants in 1801, and 303,181 in 1811. See POPULATION.

SOMERTON, a town in Somersetshire, with a market on Tuesday. It was formerly a considerable place, from which the county took its name, and is at present pretty large. It is 13 miles S. of Wells, and 123 W. by S. of London. Lon. 2. 40 W. Lat. 51. 22 N.

SOMERVILLE (William), an English poet, was born of a good family in Warwickshire, in 1692, and educated at Winchester-school, from whence he was sent to New college, Oxford, where he was chosen fellow. Dr. Johnson says, "I never heard of him but as a poet, a country gentleman, and a useful justice of peace." He died in 1743, in consequence of hard drinking. His Chace is a classical performance, though the vehicle of blank verse is excessively ill-suited to the subject.

SO'METHING. *s.* (ꝑumðing, Saxon.) 1. A thing existing, though it appears not what; a thing indeterminate (*Pope*). 2. More or less; not nothing (*Pope*). 3. A thing wanting a fixed denomination. 4. Part (*Watts*). 5. Distance not great (*Shakspeare*).

So'METHING. *ad.* In some degree (*Temple*).

SO'METIME. *ad.* (*some* and *time*.) 1. Once; formerly (*Shakspeare*). 2. At one time or other hereafter.

So'METIMES. *ad.* (*some* and *times*.) 1. Not never; now and then; at one time or other (*Taylor*). 2. At one time; opposed to *sometimes*, or to *another time* (*Burnet*).

SO'MEWHAT. *s.* (*some* and *what*.) 1. Something; not nothing, though it be uncertain what (*Atterbury*). 2. More or less (*Grew*). 3. Part, greater or less (*Dryden*).

So'MEWHAT. *ad.* In some degree (*Dryden*).

SO'MEWHERE. *ad.* (*some* and *where*.) In one place or other; not nowhere (*Newton*).

SO'MEWHILE. *s.* (*some* and *while*.) Once; for a time: out of use (*Spenser*).

SOMMA, a town of Naples, in Terra di Lavoro, near which is annually produced between 7000 and 8000 pounds weight of silk of the best quality. It is 10 miles E. of Naples.

SOMME, a department of France, including the late province of Picardy. It takes its name from a river which rises in the department of Aisne, and watering St. Quentin, Peronne, Amiens, and Abbeville, enters the English Channel. Amiens is the capital.

SOMMIERES, a town of France, in the department of Gard. It has a manufacture of thick serges, which bear its name; and is seated on the Vidourle, 10 miles W. of Nismes. Lon. 4. 11 E. Lat. 43. 48 N.

SOMNAMBULI. Sleepwalkers.

SOMNAMBULISM. Sleepwalking. For its cause, see the article SLEEP, sections vii. and viii.

SOMNI'FEROUS. *a.* (*somnifer*, Latin.) Causing sleep; procuring sleep; soporiferous; dormitive (*Walton*).

SOMNI'FIC. *a.* (*somnus* and *facio*, Latin.) Causing sleep.

SO'MNOLENCY. *s.* (*somnolentia*, Latin.) Sleepiness; inclination to sleep.

SOMNUS, in heathen mythology, son of Erebus and Nox, one of the infernal deities, who presided over sleep. His palace is a dark cave, where the sun never penetrates. At the entrance are a number of poppies and somniferous herbs. The god himself is represented as asleep on a bed of feathers with black curtains. The dreams stand by him, and Morpheus, as his principal minister, watches to prevent any noise from awaking him.

SON. *s.* (*sunus*, Gothic; ƿuna, Saxon; *sohn*, German; *son*, Swedish; *sone*, Dutch.) 1. A male born of one or begotten by one; correlative to father or mother (*Shakspeare*). 2. Descendant, however distant (*Isaiah*). 3. Compellation of an old to a young man (*Shakspeare*). 4. Native of a country (*Pope*). 5. The second person of the Trinity (*Matthew*). 6. Product of any thing (*Brown*). 7. In scripture, *sons* of pride, and *sons* of light, denoting some quality.

SON-IN-LAW. *s.* One married to one's daughter (*Dryden*).

SO'NSHIP. *s.* (from *son*.) Filiation (*Decay of Piety*).

SONATA. (Italian.) In music, an instrumental composition consisting of several movements calculated to display the powers and expression of the instruments for which it is written. The sonata, which is designed for a single instrument to each part, is in instrumental composition what the cantata is in vocal composition; and varies from the overture and concerto as the trio or quartet differs from the chorus.

There are several kinds of sonatas. The Italians, however, reduce them principally to two; the *Sonata da Camera*, or Chamber Sonata; and the *Sonata da Chiesa*, or Church Sonata. The sonata, of whatever kind, generally opens with an *adagio*; and after two or three movements of various descriptions, concludes with an *allegro* or a *presto*. This definition of a sonata, however, rather belongs to what is called the ancient than to the modern music, in which the sonata is chiefly composed as a lesson or exercise for a single instrument.

SONATINA. (Italian.) A short sonata. The diminutive of that word.

SONCHUS. Sow-thistle. Hare's lettuce. In botany, a genus of the class syngenesia, order polygamia æqualis. Receptacle naked; calyx imbricate, swelling at the base; down simple, sessile. Thirty-four species, chiefly natives of warm climates; the two following common to our own country.

1. S. oleraceus. Common sow-thistle. Peduncles woolly, umbelled; calyx glabrous; leaves runcinate, toothed. Found wild in our wastes.

2. S. cæruleus. Blue-flowered sow-thistle: with bristly naked peduncles. Found in our high pastures. Both weeds injurious to other vegetables.

SONCINO, a strong town of Italy, in the Cremonese, seated on the Oglio, 20 miles N.W. of Cremona. Lon. 9. 44 E. Lat. 45. 24 N.

SONDERBORG, a seaport of Denmark, in the island of Alsen. It has one of the best harbours in Denmark, and a royal palace, in which Christian II. king of Denmark was confined as a prisoner 13 years. It is 16 miles E.N.E. of Flendsburg. Lon. 9. 49 E. Lat. 54. 57 N.

SONDERSHAUSEN, a town of Upper Saxony, situate on the Wipper, 20 miles N.E. of Mulhausen, and 26 N. of Erfurt. Lon. 11. 5 E. Lat. 48. 25 N.

SONG. *s.* (from ȝeþunȝen, Saxon.) 1. Any thing modulated in the utterance (*Milton*). 2. A poem to be modulated by the voice; a ballad (*Shakspeare*). 3. A poem; lay; strain (*Dryden*). 4. Poetry; poesy (*Pope*). 5. Notes of birds (*Dryden*). 6. *Old* SONG. A trifle (*More*).

SONG. A short lyric poem set to music.

The use of songs seems to be a natural consequence from that of words, and in effect is scarcely less general. The ancients had the art of singing before they had that of writing, and their laws, as well as their histories, were sung long before they were inscribed.

All lyric poetry, properly speaking, consists of songs, but we only treat of that which more commonly bears this name, and which, as far as concerns the ancient songs, will lead us to some curious particulars.

To begin with the songs of the table. In the most remote times of Greece, all the guests, according to Dicearchus, Plutarch, and Artemon, sung together, and in the same strain, the praises of the divinity. Hence these songs were real pæans, or sacred canticles. The guests afterwards sung successively, each in his turn, holding a branch of myrtle, which passed from the hand of him who had sung to him who was to sing next.

At length, when music was improved, and the lyre was used in feasts, only the ingenious

and scientific were qualified to sing at table, at least to the accompaniment of the lyre. The others, obliged to sing unaccompanied, and to confine themselves to the branch of myrtle, gave birth to a Greek proverb, by which they said of a man when they would tax him with ignorance, that he "sung with the myrtle."

The subjects of the *scolia*, or songs sung to the lyre, were not only drawn from love and wine, like modern festive songs, but from history, war, and even morality.

The Greeks had also songs proper to the different professions: such as the Song of the Shepherds, the Song of the Reapers, the Song of the Millers, the Song of the Weavers, the Song of the Wool-carders, the Song of the Nurses, the Song of Lovers, the Song of the Ladies, and the Song of young Girls.

They had also a marriage song, called Hymenea, the Song Datis for merry occasions; for lamentation, Jaleme; and Linos for funerals. Lastly, there were also hymns, or Songs in honour of the Gods and Heroes. This genus passed from the Greeks to the Romans, and several of the odes of Horace are gallant or Bacchanalian.

The moderns have also their songs of different kinds according to the taste and genius of each country; but the Italians, English, and French, bear away the palm from the rest of Europe in this species of composition. The genuine Scotch and Irish songs have, however, the merit of an originality of character, and possess an exclusive sweetness which has always delighted the ears of every nation. (*Busby*).

The best collections of British songs are those by Percy, Aikin, and Plumtre.

Song of birds. The song of birds has been defined to be a succession of three or four different notes, which are continued without interruption through the same intervals, in a bar of four crotchets, *adagio*, or whilst a pendulum swings four seconds.

It is observed, that notes in birds are no more innate than language in man, and that they depend entirely on the master under which they are bred, as far as their organs will enable them to imitate the sounds which they have frequent opportunities of hearing: and their adhering so steadily, even in a wild state, to the same song, is entirely owing to the nestlings attending only to the instruction of the parent-bird, whilst they disregard the notes of all others that may, perhaps, be singing round them.

Birds in a wild state do not commonly sing more than six or seven months out of the twelve; but birds that are caged and have plenty of food sing the greatest part of the year: and we may add, that the female of no species of birds ever sings. It has been remarked, that there is no instance of any bird singing whose size exceeds that of our blackbird; and this is supposed to arise from the difficulty it would have of concealing itself, did it call the attention of its enemies, not only by its bulk, but by the proportionable loudness of its notes.

It has been noticed by some writers, that certain passages of the song in a few kinds of birds correspond with the intervals of our scale, of which, indeed, the cuckow affords a striking and well-known instance; but much the greater part of such song is not capable of musical notation; partly because the rapidity is often so great, and it is also so uncertain when they may stop, that we cannot reduce the passages to the form of any musical bar whatsoever; partly also because the pitch of most birds is considerably higher than that of the shrillest notes of our highest instruments; and principally because the intervals used by birds are commonly so minute, and consequently so different from the more gross intervals into which we divide our octave, that we cannot judge of them.

Most people, who have not attended to the notes of birds, suppose that all those of the same species sing exactly the same notes and passages, which is by no means true, though it must be admitted that there is a general resemblance. Thus the London bird-catchers prefer the song of the Kentish goldfinches and Essex chaffinches; but some of the nightingale-fanciers prefer a Surrey bird to one of Middlesex.

The nightingale has been almost universally esteemed the most capital of singing birds; and its superiority chiefly consists in the following particulars: its tone is much more mellow than that of any other bird, though by the exertion of its powers it can be extremely brilliant. Another point of superiority is its continuance of song without a pause, which is often extended to twenty seconds.

The following table, formed by the honourable Daines Barrington, agreeably to the idea of M. de Piles in estimating the merits of painters, is designed to exhibit the comparative merit of the British singing birds; in which 20 is supposed to be the point of absolute perfection.

	Mellowness of tone.	Sprightly notes.	Plaintive notes.	Compass.	Execution.
Nightingale - - -	19	14	19	19	19
Sky-lark - - - -	4	19	4	18	18
Wood-lark - - - -	18	4	17	12	8
Tit-lark - - - - -	12	12	12	12	12
Linnet - - - - -	12	16	12	16	18
Goldfinch - - - -	4	19	4	12	12
Chaffinch - - - -	4	12	4	8	8
Greenfinch - - - -	4	4	4	4	6
Hedge-sparrow - -	6	0	6	4	4
Aberdavine or siskin -	2	4	0	4	4
Red-poll - - - -	0	4	0	4	4
Thrush - - - - -	4	4	4	4	4
Blackbird - - - -	4	4	0	2	2
Robin - - - - -	6	16	12	12	12
Wren - - - - -	0	12	0	4	4
Reed sparrow - - -	0	4	0	2	2
Black-cap or Norfolk mock nightingale	14	12	12	14	14

SO'NGISH. *a.* (from *song.*) Containing songs; consisting of songs (*Dryden*).

SO'NGSTER. *s.* (from *song.*) A singer (*Howel*).

SO'NGSTRESS. *s.* A female singer.

SONI'FEROUS. *a.* (*sonus* and *fero*, Latin.) Giving or bringing sound (*Derham*).

SONNERATIA, in botany, a genus of the class icosandria, order monogynia. Calyx six-cleft; petals six, lanceolate; berry many-celled; the cells many-seeded. One species only; a tree of New Guinea, with opposite, oblong, entire leaves; flowers terminal, solitary, large; fruit acid; petals red.

SONNET. (from the Italian.) A lyrical composition properly comprised in fourteen verses; viz. two stanzas of four verses each, and two of three each; the eight first verses being all in two rhymes.

The sonnet is of Italian origin, and Petrarch has the honour of its invention.

Du Bellai is said by Pasquier to have first introduced sonnets into France, but Du Bellai himself tells us, that Melin de S. Gelais first converted the Italian sonnets into French. Who first gave them an English dress is not certainly known, but Milton has left us twenty-three examples of this species of song, amongst which that addressed to the musician Laws, and the exquisite one on his deceased wife, are the best, though they both serve to prove how difficult of construction the sonnet is in the English language.

SONNETTE'ER. *s.* (*sonnetier*, Fr. from *sonnet.*) A small poet, in contempt (*Pope*).

SONORI'FIC. *a.* (*sonorus* and *facio*, Lat.) Producing sound (*Watts*).

SONO'ROUS. *a.* (*sonorus*, Latin.) 1. Loud sounding; giving loud or shrill sound (*Milton*). 2. High sounding; magnificent of sound (*Addison*).

SONO'ROUSLY. *ad.* With high sound; with magnificence of sound.

SONO'ROUSNESS. *s.* (from *sonorous.*) 1. The quality of giving sound (*Boyle*). 2. Magnificence of sound.

SOON. *ad.* (*suns*, Gothick; ſona, Saxon.) 1. Before long time be past; shortly after any time assigned or supposed (*Dryden*). 2. Early; before any time supposed; opposed to late (*Bacon*). 3. Readily; willingly (*Addison*). 4. Soon as. Immediately (*Exodus*).

SOO'NLY. *ad.* (from *soon.*) Quickly; speedily (*More*).

SOOT, a volatile matter arising from wood and other fuel along with the smoke; or rather, it is the smoke itself condensed and gathered to the sides of the chimney. Though once volatile, however, soot cannot be again resolved into vapour; but, if distilled by a strong fire yields a volatile alkali and empyreumatic oil, a considerable quantity of fixed matter remaining at the bottom of the distilling vessel. If burnt in an open fire, it flames with a thick smoke, whence other soot is produced. It is used as a material for making sal-ammoniac, and as a manure.

SOO'TED. *a.* (from *soot.*) Smeared, manured, or covered with soot (*Mortimer*).

SOO'TERKIN. *s.* A kind of false birth fabled to be produced by the Dutch women from sitting over their stoves (*Swift*).

SOOTH. *s.* (ſoð, Saxon.) Truth; reality: obsolete (*Shakspeare*).

SOOTH. *a.* (ſoð, Saxon.) Pleasing; delightful (*Milton*).

To SOOTH. *v. a.* (ȝeſoðain, Saxon.) 1. To flatter; to please with blandishments (*Addison*). 2. To calm; to soften; to mollify (*Dryden*). 3. To gratify; to please (*Dryden*).

SOO'THER. *s.* (from *sooth.*) A flatterer; one who gains by blandishments (*Shakspeare*).

To SOOTHSA'Y. *v. n.* (*sooth* and *say*.) To predict; to foretel (*Acts*).

SOOTHSA'YER. *s.* (from *soothsay*.) A foreteller; a predictor; a prognosticator (*Shakspeare*).

SOO'TINESS. *s.* (from *sooty*.) The quality of being sooty; fuliginousness.

SOO'TY. *a.* (from *soot*.) 1. Breeding soot (*Milton*). 2. Consisting of soot; fuliginous (*Wilkins*). 3. Black; dark; dusky (*Milton*).

To SOO'TY. *v. n.* (from *soot*.) To make black with soot (*Chapman*).

SOP. *s.* (sop, Saxon; *soppe*, Dutch.) 1. Any thing steeped in liquor, commonly to be eaten (*Bacon*). 2. Any thing given to pacify (*Swift*).

To SOP. *v. a.* To steep in liquor.

SOPE. *s.* See SOAP.

SOPEBERRY. See SAPINDUS.

SOPEWORT. See SAPONARIA.

SOPH. *s.* (from *sophista*, Latin.) A young man who has been two years at the university (*Pope*).

SOPHI, or SOFI, a title given to the emperor of Persia; importing as much as wise, sage, or philosopher. The title is by some said to have taken its rise from a young shepherd named Sophi, who attained to the crown of Persia in 1370; others derive it from the sophoi or sages, anciently called magi. Vossius gives a different account of the word: Sophi in Arabic, he observes, signifies wool; and he adds, that it was applied by the Turks out of derision to the kings of Persia ever since Ishmael's time; because, according to their scheme of religion, he is to wear no other covering on his head but an ordinary red woollen stuff; whence the Persians are also called bezelbaschs, q. d. red-heads.

SOPHI'A. (σοφια, from σοφος, wise; so named from its great virtues in stopping fluxes.) Flixweed or flux-weed.

SOPHI'A CHIRURGO'RUM. This plant, Sisymbrium sophia of Linnéus, is now almost banished from practice. It was formerly in high estimation in the cure of wounds. It has been given internally in hysterical affections and uterine hæmorrhages, and the seeds are said to be efficacious in destroying intestinal worms.

SOPHISM, (σοφισμα,) in logic, a captious and fallacious reasoning; or an argument, which, with some subtilty, carries much appearance of truth, but little solidity. See FALLACY.

A sophism is, properly, an argument false at bottom, and only invented to amuse and embarrass the person to whom it is used.

Logicians enumerate the following kinds of sophism, viz. *ignoratio elenchi*, or a mistake of the question, i. e. when something else is proved, which has neither any necessary connection or inconsistency with the thing enquired, and consequently gives no determination to the enquiry, though at first sight it may seem to determine the question: *Petitio principii*, a circle; *non causa pro causa*, or the assignation of a false cause; *fallacia accidentis*, which pronounces concerning the nature and essential properties of any subject, according to some thing which is merely accidental to it. *A dicto secundum quid ad dictum simpliciter*, arguing from that which is true in particular circumstances to prove the same thing true absolutely, simply, and abstracted from all circumstances, and vice versa: the sophisms of composition and division, when we infer any thing concerning ideas in a compounded sense, which is only true in a divided sense, and vice versa: and the sophisms arising from an abuse of the ambiguity of words: to which may be added an imperfect enumeration, or false induction, when from a few experiments and observations, men infer general theorems and universal propositions. Watts's Logic, p. iii. c. 3. sect. 1.

SOPHISMS, or SOPHISTICAL ARGUMENTS, among logicians, are more particularly such as are not in form, or are founded on equivocals.

As, You have every thing you have not lost; but you have not lost horns, therefore you have horns.

SOPHIST. (σοφιστης, formed from σοφος, wise; or rather from σοφιζω, impostor, deceiver.) A person who frames sophisms; that is, uses subtile arguments, with design to deceive those he would persuade or convince.

The term sophist, which is now reproachful, was anciently honourable, and carried a very innocent idea. St. Augustin observes, it signifies a rhetor, or professor of eloquence: such as were Lucian, Athenæus, Libanius, &c.

Suidas, and after him Olar. Celsius, in an express dissertation on the Greek sophists, tells us, that the appellation was applied indifferently to all who excelled in any art or science; whether divines, lawyers, physicians, poets, orators, or musicians.

However, as rhetoricians often employed their art rather to vindicate what was false and unjust than to support truth and virtue, their conduct brought a discredit both upon themselves and their profession; and, therefore, the name sophist, or sophister, has been more generally used in an ill sense, to signify one skilled rather in the arts of cavilling, than qualified to speak well and accurately upon any subject.

SO'PHISTER. *s.* (*sophiste*, French.) 1. A disputant fallaciously subtle; an artful but insidious logician (*Rogers*). 2. A professor of philosophy; a sophist (*Hooker*).

SOPHI'STICAL. *a.* (*sophistique*, French.) Fallaciously subtle; logically deceitful (*More*).

SOPHI'STICALLY. *ad.* (from *sophistical*.) With fallacious subtilty (*Swift*).

To SOPHI'STICATE. *v. a.* (*sophistiquer*, French, from *sophist*.) To adulterate; to corrupt with something spurious (*Boyle*).

SOPHI'STICATE. *part. a.* (from the verb.) Adulterate; not genuine (*Glanville*).

SOPHISTICATION. A term employed in pharmacy, to signify the conterfeiting or adulterating any medicine. This practice unhappily obtains with most dealers in drugs, &c.; and the cheat is carried on so artificially

by many as to prevent a discovery even by persons of the most discerning faculties.

SOPHISTICA'TOR. *s.* (from *sophisticate.*) Adulterator; one that makes things not genuine.

SO'PHISTRY. *s.* (from *sophist.*) 1. Fallacious ratiocination (*Sidney*). 2. Logical exercise (*Felton*).

SOPHOCLES, a celebrated tragic poet of Athens, educated in the school of Æschylus, distinguished himself not only as a poet, but also as a statesman. He commanded the Athenian armies, and in many battles he shared the supreme command with Pericles. Sophocles was the rival of Euripedes for public praise, they divided the applause of the populace, and while the former surpassed in the sublime and majestic, the other was not inferior in the tender and pathetic. The two poets, however, captivated at last by popular applause, gave way to jealousy and rivalship. Of 120 tragedies which Sophocles composed, only seven are extant. The ingratitude of the children of Sophocles is well known. Tired of his long life, from a wish to enjoy his possessions, they accused him before the Areopagus of insanity. The only defence the poet made was to read his tragedy of Œdipus at Colonos, which he had lately finished, and then he asked his judges, whether the author of such a performance could be taxed with insanity? The father upon this was acquitted, and the children returned home covered with shame and confusion. Sophocles died in the 91st year of his age, 406 years before Christ, through excess of joy, as some authors report, of having obtained a poetical prize at the Olympic games.

The editio princeps of Sophocles, by Aldus, printed in 8vo. at Venice in 1503, is much and deservedly valued. Other valuable editions are, by Turnebus, 4to. 1553, Cum Schol.; by H. Stephens, 4to. 1558; the Antwerp edition printed by Plantin, 12mo. 1579; the splendid Paris edition begun by Capperonnien and finished by Vauvilliers, 4to. 1781; and the excellent editions of Brunck, in 1786 and 1789.

SOPHONISBA, a daughter of Asdrubal, married Scyphax, a prince of Numidia, and when her husband was conquered by the Romans and Masinissa, she fell a captive into the hands of the enemy. Masinissa became enamoured of her, and married her. This behaviour displeased the Romans, and Scipio, who, at that time, had the command in Africa, rebuked the monarch, and desired him to part with Sophonisba. Masinissa upon this entered Sophonisba's tent, and told her, that as he could not deliver her from the jealousy of the Romans, he recommended her as the strongest pledge of his love to die like the daughter of Asdrubal. Sophonisba obeyed, and drank with uncommon composure the cup of poison which Masinissa sent to her, about 203 years before Christ.

SOPHORA, in botany, a genus of the class decandria, order monogynia. Calyx toothed, gibbous on the upper side; corol papilionaceous, with the wings as long as the standard; legume moniliform. Nine species, scattered chiefly over America, the islands of India, and Polynesia. The following are cultivated:

1. S. tetraptera. Wing-podded sophora.
2. S. microphylla. Small-leaved shrubby sophora.
3. S. alopecuroides. Fox-tail sophora.
4. S. australis. Blue sophora.
5. S. tinctoria. Dyer's sophora.
6. S. alba. White sophora.
7. S. tomentosa. Downy sophora.
8. S. occidentalis. Occidental sophora.
9. S. japonica. Shining-leaved sophora.
10. S. capensis. Vetch-leaved sophora.
11. S. aurea. Golden-flowered sophora.
12. S. myrtilifolia. Round-leaved sophora.
13. S. heptaphylla. Seven-leaflet sophora.

This last is known in old dispensatories under the name anticholerica: the seeds are intensely bitter, and are said to be useful in cholera, colic, and dysury.

The first five may be increased either by seeds or parting the roots, and are hardy plants; the rest are to be raised by seeds alone, and must be treated as green-house plants.

SOPIENTS. (*sopientia.*) Opiates: medicines to procure sleep.

SOPOR. Profound sleep.

To SO'PORATE. *v. n.* (*soporo*, Latin.) To lay asleep.

SOPORI'FEROUS. *a.* (*sopor* and *fero.*) Productive of sleep; causing sleep; narcotic; opiate; dormitive; somniferous. See ANODYNES.

SOPORI'FEROUSNESS. *s.* (from *soporiferous.*) The quality of causing sleep.

SOPORI'FIC. *a.* (*sopor* and *facio.*) Causing sleep; opiate; narcotic (*Locke*).

SO'PPER. *s.* (from *sop.*) One that steeps any thing in liquor.

SOPRA. (Ital.) In music. Above, or upper; as *Nelle porte di sopra*; in the higher or upper part. *Di sopra*, above. *Contrapunto sopra il sogetto*; counterpoint above the subject.

SOPRANO. (Ital.) The treble, or higher voice part, or parts: as *a doi soprani*, for two trebles; *a tre soprani*, for three trebles.

SORACTES and SORACTE, a mountain of Etruria, near the Tiber, sacred to Apollo, who is from thence surnamed Soractis; and, it is said, that the priests of the god could walk over burning coals without hurting themselves. There was, as some report, a fountain on mount Soracte, whose waters boiled at sun-rise, and instantly killed all such birds as drank there.

SORB TREE. See SORBUS.

SO'RBILE. (from *sorbeo*, Latin.) That may be drunk or sipped.

SORBI'TION. *s.* (*sorbitio*, Latin.) The act of drinking or sipping.

SORBONNE, or SORBON, the house or college of the faculty of theology established in the university of Paris. It was founded in 1252 by St. Louis, or rather by Robert de Sorbon his confessor and almoner, first canon of Cambray, and afterwards of the church of

Paris; who gave his own name to it, which he himself took from the village of Sorbon or Serbon, near Sens, where he was born. The foundation was laid in 1250; queen Blanche, in the absence of her husband, furnishing him with a house which had formerly been the palace of Julian the apostate, of which some remains are still seen. Afterwards the king gave him all the houses he had in the same place, in exchange for some others. The college was magnificently rebuilt by the cardinal de Richelieu. The design of its institution was for the use of poor students in divinity. There were lodgings in it for 36 doctors, who are said to be of the society of the Sorbonne; those admitted into it without being doctors were said to be of the hospitality of the Sorbonne. Six regent doctors formerly held lectures every day for an hour and a half each; three in the morning, and three in the afternoon.

SORBONNE, was also used in general for the whole faculty of theology at Paris; as the assemblies of the whole body were held in the house of Sorbonne; and the bachelors of the other houses of the faculty, as the house of Navarre, &c. came thither to hold their *sorbonnique*, or act for being admitted doctor in divinity.

SORBUS, in botany, a tribe of the genus pyrus, including the different species of mountain-ash, and service or sorb-tree. See PYRUS.

SO'RCERER. *s.* (*sorcier*, French.) A conjurer; an enchanter; a magician (*Shaks.*).

SO'RCERESS. *s.* (female of *sorcerer*.) A female magician; an enchantress (*Bacon*).

SORCERY, or MAGIC; the power which some persons were formerly supposed to possess of commanding the devil and the infernal spirits by skill in charms and invocations, and of soothing them by fumigations. Sorcery is therefore to be distinguished from witchcraft; an art which is supposed to be practised, not by commanding evil spirits, but by compact with the devil. As an instance of the power of bad smells over dæmons or evil spirits, we may mention the flight of the evil spirit mentioned in Tobit into the remote parts of Egypt, produced, it is said, by the smell of the burnt liver of a fish. Lilly informs us, that one Evans having raised a spirit at the request of lord Bothwell and sir Kenelm Digby, and forgetting a fumigation, the spirit, vexed at the disappointment, pulled him without the circle, and carried him from his house in the Minories into a field near Battersea Causeway. King James, in his Dæmonologia, has given a very full account of the art of sorcery.

SO'RD. *s.* (corrupted from *sward*.) Turf; grassy ground (*Shakspeare*).

SO'RDES. *s.* (Latin.) Foulness; dregs (*Woodward*).

SORDES, in medicine. When the matter discharged from ulcers is rather viscid or glutinous, it is thus named. This matter is frequently of a brownish red colour, somewhat resembling the grounds of coffee or grumous blood mixed with water. Sordes, sanies, and ichor, are all of them much more fetid than purulent matter, and none of them are altogether free from acrimony; but that which is generally termed ichor is by much the most acrid of them, being frequently so sharp and corrosive as to destroy large quantities of the neighbouring parts.

SO'RDET. SO'RDINE. *s.* (*sourdine*, Fr. *sordina*, Italian.) A small pipe put into the mouth of a trumpet, to make it sound lower or shriller (*Bailey*).

SO'RDID. *a.* (*sordidus*, Latin.) 1. Foul; gross; filthy; dirty (*Dryden*). 2. (*sordide*, French.) Intellectually dirty; mean; vile; base (*South*). 3. Covetous; niggardly (*Denh.*).

SO'RDIDLY. *ad.* (from *sordid*.) Meanly; poorly; covetously.

SO'RDIDNESS. *s.* (from *sordid*.) 1. Meanness; baseness (*Cowley*). 2. Nastiness; not neatness (*Ray*).

SORDINO. (Italian.) A small utensil of copper, or silver, applied to the bridge of a violin, or violoncello, to render the sound fainter, by intercepting the vibrations of the body of the instrument.

SORE. *s.* (from *saur*, French.) A buck in his fourth year (*Shakspeare*).

SORE. *s.* (ran, Saxon.) A place tender and painful; a place excoriated; an ulcer (*Shakspeare*).

SORE. *a.* (from the noun.) 1. Tender to the touch (*Locke*). 2. Tender in the mind; easily vexed (*Pope*). 3. Violent with pain; afflictively vehement (*Common Prayer*) 4. Criminal: out of use (*Shakspeare*).

SORE. *ad.* With painful or dangerous vehemence (*Common Prayer*).

SORE-THROAT. See CYNANCHE.

SOREE, in ornithology. See RALLUS.

SO'REHON. SORN. *s.* (Irish and Scottish.) A servile tenure formerly in Scotland and Ireland. Whenever a chieftain had a mind to revel, he came down among the tenants with his followers, and lived on free quarters; so that when a person obtrudes himself upon another for bed and board, he is said to *sorn* (*Machean*).

SO'REL. *s.* (diminutive of *sore*.) A buck in his third year (*Shakspeare*).

SO'RELY. *ad.* (from *sore*.) 1. With a great degree of pain or distress (*Dryden*). 2. With vehemence dangerous or afflictive (*Shaksp.*).

SO'RENESS. *s.* (from *sore*.) Tenderness of a hurt (*Temple*).

SOREX. Shrew. In zoology, a genus of the class mammalia, order feræ. Fore-teeth upper two, long, bifid; lower from two to four, the intermediate ones shorter; tusks many on each side; grinders cuspidate. These in their head resemble the mole, in other parts the mouse; they burrow in the ground; generally feed on worms and insects; live under ground, some near the water; body thick; feet five-toed; head lengthened, terminated by a conic snout; eyes small. Seventeen species, scattered over the globe; two common to our own country. The following are mostly worthy of notice.

Of this genus there are twelve species. Their generic characters are two cutting teeth in each jaw, pointing forward; a long slender nose; small ears; and five toes on each foot.

1. S. moschatus. Musky shrew. Feet palmate; tail flattened, thickest in the middle. Seven inches long, and of a dusky colour; no external ears; very small eyes; tail eight inches, compressed sideways; belly ash colour: inhabits the river Wolga, and the lakes adjacent; is very slow, and never wanders far from lakes and rivers: makes its hole in the banks, far below the lowest fall of the water, and works upwards, not so high as to reach the surface, but only to be out of the reach of the highest rise of the water: feeds on fish, but is itself devoured in its turn by pikes and siluri; and gives those fish so strong a flavour of musk as to render them not eatable. Out of its tail is expressed a sort of musk, very much resembling the genuine kind. The skin is put into chests among clothes to drive away moths, and to preserve the wearers from pestilence and fevers. These are so common near Nizney Novogorod, that every peasant frequently brings 500 to market, and sells them for a ruble per hundred.

2. S. cæruleus. Blue shrew. Tail middle length, upper parts pale blue; belly lighter; legs and feet white. Near eight inches long; tail three and a half: upper jaw extends far beyond the lower: upper fore teeth short, lower long and slender: long white whiskers; small eyes; ears transparent, broad and round; and a fine coat of short close hair, of a pale cerulian on the upper parts, lighter beneath; with white feet. It inhabits Java and others of the East Indian islands. It eats rice; but has so strong a scent of musk as to perfume every thing it runs over. It is said, but extravagantly, that by merely passing over it, it will render the wine in a well-corked bottle not drinkable. Cats will not touch them.

3. S. Mexicanus. Mexican shrew. Tail short; fore-feet three-toed; hind-feet four.

4. S. Brasiliensis. Brasilian shrew. Brown; back black, with three stripes.

5. S. murinus. Murine shrew. Tail middle length; body brown; feet and tail cinereous.

The first is about nine inches long, with short hair of a tawny colour. It is without sight, of a thick, fat, and fleshy body. Its legs are so short that its body almost touches the ground: it burrows and makes such a number of cavities, that travellers can scarcely tread with safety: it feeds on roots, kidney beans, and other seeds; and is eatable. Buffon thought it a mole; but from its ears Mr. Pennant classes it here.

The Brasilian shrew, five inches long, is of a dusky colour, and marked along the back with three broad black strokes: scrotum pendulous; tail two inches: it does not fear the cat; neither does that animal hunt after it.

The murine shrew, so called as being of the size of a common mouse, is of an ash colour, and inhabits Java: it has a long nose, hollow beneath, with very long hair about its nostrils; ears rounded, and rather naked; the tail a little shorter than the body, and not so hairy.

6. S. araneus. Fetid shrew. Tail middle length; body whitish beneath. Two other varieties with upper parts dusky, or greyish, both which inhabit Hudson's Bay and Labrador.

7. S. bicolor. Water shrew. Tail middle length, nakedish; body blackish, beneath cinereous; toes fringed.

The eyes of the first are small, and almost hid in its fur: the head and upper part of the body a brownish red: belly dirty white: two inches and a half long; tail one and a half: it inhabits Europe, Siberia, and even the Arctic flats, and Kamschatka: it is also found about the Caspian sea; lives in old walls, heaps of stones, or holes in the earth; feeds on corn, insects, or any filth, and has a disagreeable smell: cats will kill, but not eat it: it brings four or five young at a time. There seems to be an annual mortality of these animals in August, numbers of them being then found dead in the paths.

The water shrew has, like the rest, a long slender nose; very minute ears, and within each a tuft of white hair; very small eyes hid in the fur: upper part of the body black: throat, breast, and belly, of a light ash colour; feet white: it has a triangular dusky spot beneath the tail: it is three inches and three quarters long; tail two.

It inhabits Europe and Siberia, as far as the river Jenesay; burrows in the banks of rivers; swims under water; and chirrups like a grasshopper: female teats ten; brings nine young.

8. S. minutus. Minute shrew. Snout very long; tailless.

9. S. exilis. Pigmy shrew. Tail very thick in the middle, tapering to each end.

The head of the minute shrew is near as big as the body; the whiskers reach the eyes, which are very small, and capable of being drawn in: hair very fine and shining, grey above and white beneath: it is found about the Oby and near the Kama: lives on seeds; digs; runs swiftly; and has the voice of a bat: weighs a dram.

The pigmy shrew, in shape and colour, resembles the fetid, but paler: tail small at both ends, and thick in the middle; very common about the Jenesay and the Oby: weighs about half a drachm only; the least of all quadrupeds.

The white footed, square tailed, carinated, and unicolor shrews, have little to distinguish them except their generic characters, and those peculiarities from which they take their specific name. The carinated is named from the tail being ridged below like the keel of a vessel.

These four species inhabit the neighbourhood of Strasburg.

SORITES, in logic, a species of reasoning in which a great number of propositions are so linked together, that the predicate of the one becomes continually the subject of the next following, till at last a conclusion is formed by

bringing together the subject of the first proposition and the predicate of the last. Such was that merry argument of Themistocles, to prove that his little son under ten years old governed the whole world. Thus: "My son governs his mother; his mother me; I the Athenians; the Athenians the Greeks; Greece commands Europe; Europe the whole world: therefore my son commands the whole world." See LOGIC.

SORO'RICIDE. *s.* (*soror* and *cædo.*) The murder of a sister.

SO'RRAGE. *s.* The blades of green wheat or barley.

SORRANCE. (*sore-ance.*) In old farriery, a term implying either an ill state or habit of an horse's body, arising from some part diseased; or a looseness of continuity of the parts, which, according to the various circumstances, acquire new names, as fracture, wound, ulcer, rupture, convulsion, cramp, &c.

SORREL, in botany. See RUMEX.

SORREL TREE, in botany. See RUMEX and ANDROMEDIA.

SORREL WOOD, in botany. See OXALIS.

SORREL. A term of colour applied to horses, importing a mixt hue between a bright bay and a yellow chesnut.

SORRENTO, a seaport town of the kingdom of Naples, with an archbishop's see. It is seated in a peninsula, on the bay of Naples, at the foot of a mountain of the same name, 17 miles S.E. of Naples. It is the birth-place of Torquato Tasso. Lon. 14. 24 E. Lat. 40. 36 N.

SO'RRILY. *ad.* (from *sorry.*) Meanly; poorly; despicably; wretchedly; pitiably (*Sidney*).

SO'RRINESS. *s.* (from *sorry.*) Meanness; wretchedness; pitiableness; despicableness.

SO'RROW. *s.* (*sorg*, Danish.) Grief; pain for something past; sadness; mourning (*Milt.*).

To SO'RROW. *v. n.* (ꝛopȝian, Saxon.) To grieve; to be sad; to be dejected (*Milton*).

SO'RROWED. *a.* (from *sorrow.*) Accompanied with sorrow: out of use (*Shakspeare*).

SO'RROWFUL. *a.* (*sorrow* and *full.*) 1. Sad for something past; mournful; grieving (*Tobit*). 2. Deeply serious: not in use (*Samuel*). 3. Expressing grief; accompanied with grief (*Job*).

SORROWFUL TREE. See NYCTANTHES.

SO'RRY. *a.* (ꝛaꝛuȝ, Saxon.) 1. Grieved for something past (*Swift*). 2. (from *saur*, filth, Islandic.) Vile; worthless; vexatious (*Milton*).

SORT. *s.* (*sorte*, French.) 1. A kind; a species (*Tillotson*). 2. A manner; a form of being or acting (*Milton*). 3. A degree of any quality (*Dryden*). 4. A class or order of persons (*Atterbury*). 5. A company; a knot of people (*Shakspeare*). 6. Rank; condition above the vulgar (*Shakspeare*). 7. (*sort*, Fr.) A lot: out of use (*Shakspeare*). 8. A pair; a set; a suit.

To SORT. *v. a.* (*sortiri*, Latin.) 1. To separate into distinct and proper classes (*Shaks.*). 2. To reduce to order from a state of confusion (*Hooker*). 3. To conjoin; to put together in distribution (*Davies*). 4. To cull; to choose; to select (*Chapman*).

To SORT. *v. n.* 1. To be joined with others of the same species (*Woodward*). 2. To consort; to join (*Bacon*). 3. To suit; to fit (*Pope*). 4. (*sortir*, French.) To terminate; to issue (*Bacon*). 5. To have success (*Abbot*). 6. To fall out (*Shakspeare*).

SO'RTANCE. *s.* (from *sort.*) Suitableness; agreement (*Shakspeare*).

SORTILEGE. *s.* (*sortilege*, French.) The act or practice of drawing lots.

SO'RTMENT. *s.* (from *sort.*) 1. The act of sorting; distribution. 2. A parcel sorted or distributed.

SOSIBIUS, a grammarian of Laconia, B.C. 255. He was a great favourite of Ptolemy Philopator, and advised him to murder his brother, and the queen his wife, called Arsinoe. He lived to a great age, and was, on that account, called Polychronos. He was afterwards permitted to retire from the court, and spend the rest of his days in peace and tranquillity, after he had disgraced the name of minister, by the most abominable crimes, and the murder of many of the royal family. His son of the same name was preceptor to king Ptolemy Epiphanes.

SOSIGENES, an Egyptian mathematician, who flourished in the time of Julius Cæsar, and was employed by him in reforming the calendar, so that to him is to be attributed the formation of the Julian year, which begins 45 years B. C. He was well versed in mathematics and astronomy, but his works are lost.

SOSII, celebrated booksellers at Rome, in the age of Horace.

SOSISTRATUS, a tyrant of Syracuse, in the age of Agathocles. He invited Pyrrhus into Sicily, and afterwards revolted from him. He was at last removed by Hermocrates.

SOSTENUTO. (Italian.) In music, a word implying that the notes of the movement or passage against which it is placed are to be sustained or held on to the extremity of their lengths.

SOT. *s.* (ꝛoꝛ, Saxon; *sot*, French.) 1. A blockhead; a dull, ignorant, stupid fellow; a dolt (*South*). 2. A wretch stupified by drinking (*Roscommon*).

To SOT. *v. a.* To stupify; to infatuate (*Dryden*).

To SOT. *v. n.* To tipple to stupidity.

SO'TTISH. *a.* (from *sot.*) 1. Dull; stupid; senseless; infatuate; doltish (*Hayward*). 2. Dull with intemperance.

SO'TTISHLY. *ad.* (from *sottish.*) Stupidly; dull; senselessly (*Bentley*).

SO'TTISHNESS. *s.* (from *sottish.*) 1. Dulness; stupidity; insensibility (*Bentley*). 2. Drunken stupidity (*South*).

SOUBISE, a town of France, in the department of Lower Charente, and late territory of Saintonge. It is seated on the river Charente, 22 miles south of Rochelle. Lon. 1. 2 W. Lat. 45. 57 N.

SO'VEREIGN. *a.* (*souverain*, French.) 1.

Supreme in power; having no superior (*Dryden*). 2. Supremely efficacious; predominant over diseases (*Shakspeare*).

SO'VEREIGN. *s.* Supreme lord (*Dryden*).

SO'VEREIGNLY. *ad.* (from *sovereign.*) Supremely; in the highest degree (*Boyle*).

SO'VEREIGNTY. *s.* (*souveraineté*, Fr.) Supremacy; highest place; supreme power; highest degree of excellence (*Davies*).

SOUGH. *s.* (from *sous*, French.) A subterraneous drain (*Ray*).

SOUGHT. The pret. and part. pass. of *seek.*

SOUL. *s.* (*sapel*, Saxon; *sael*, Danish.) 1. The immaterial and immortal spirit of man (*Davies*). 2. Intellectual principle (*Law*). 3. Vital principle (*Watts*). 4. Spirit; essence; quintessence; principal part (*Shaks.*). 5. Interior power (*Shakspeare*). 6. A familiar appellation expressing the qualities of the mind (*Watts*). 7. Human being (*Addison*). 8. Active power (*Dryden*). 9. Spirit; fire; grandeur of mind (*Young*). 10. Intelligent being in general (*Milton*).

SOUL, (*anima.*) A spirit adapted to an organized body. See SPIRIT and BODY.

Many of the ancient philosophers asserted an *anima mundi*, a soul which moved and animated the machine of the universe, and gave action to all natural causes. This doctrine Plato handles very fully in his Timæus.

Others have given particular souls to all the heavenly bodies, the sun, stars, earth, &c. to regulate their motions. The philosophers, many of them, allow of two, and others of three, kinds of souls; viz. a

Rational soul, which they hold to be divine, and infused by the breath of God. This they call the spirit, and in this they suppose the intellect and will to be seated.

Sensitive or *irrational soul*, which man has in common with brutes: which is formed out of the elements, and in which they apprehend the passions and appetites are seated.

Vegetative soul, which we have in common with plants; and which, as the first is the principle of reason and understanding, or that in us which thinks and understands; and the second, the principle of life; the third is the principle of growth, nutrition, and vegetation.

The Epicureans took the substance of the soul, we mean of the rational soul, to be a subtile air, composed of their atoms, or primitive corpuscles.

The Stoics held it to be a flame, or portion of heavenly light. Spinoza and his followers allowing only of one kind of substance, viz. matter; maintain the soul to be of the same substance with the body, viz. material. See SPINOZISM.

The doctrine of the materiality of the human soul has been adopted and maintained by several modern writers; and even by those who have distinguished themselves as advocates in the cause of religion both natural and revealed. In this number we may reckon Dr. Priestley, who, rejecting the commonly received notion of matter, as an absolutely impenetrable, inert substance, and premising that the powers of sensation or perception, and thought, as belonging to man, have never been found but in conjunction with a certain organized system of matter, maintains, that those powers necessarily exist in, and depend upon such a system. In proof of this doctrine it is alleged, that perception and thought are not incompatible with the properties of matter, considered as a substance extended and endued with the powers of attraction and repulsion; and, therefore, if one kind of substance be capable of supporting all the known properties of man, true philosophy, which will not authorize us to multiply causes or kinds of substance, without necessity, will forbid us to admit of any substance in the constitution of human nature essentially different from matter. The proper seat of the powers of perception and thought, according to this writer, is the brain; because, as far as we can judge, the faculty of thinking, and a certain state of the brain, always accompany and correspond to one another; and there is no instance of any man retaining this faculty, when his brain was destroyed; and whenever that faculty is impeded or injured, there is sufficient reason to believe that the brain is disordered in proportion. Dr. Priestley apprehends, that sensation and thought necessarily result from the organization of the brain, when the powers of mere life are given to the system, and that they follow of course as much as the circulation of the blood follows respiration; but he professes to have no idea at all of the manner in which the power of perception results from organization and life.

To this reasoning it has been replied, in general, that Dr. Priestley's account of matter does not answer to the common ideas of matter, or that it is not solid extension, or an impenetrable and inert substance, which is the only matter that is the object of natural philosophy; but something not solid, that exists in space, and so far agreeing with spirit; and, consequently, if such matter is, as he asserts, the only matter possible, it will follow, not that we have no souls distinct from our bodies, but that we have no bodies distinct from our souls, and that all in nature is spirit. Besides, it has been farther urged, that a connection and dependence by no means prove sameness. From the dependence of actual sensations and thought on the brain, even if that were to be granted, we have no more reason to conclude that the brain is the mind, than a savage who had never heard the music of a harpsichord, and did not see the hand that played upon it, would have to conclude that it played upon it itself, and was the musician; because he could trace all the sounds to the instrument, and found that when the strings were out of order, the music was disturbed or destroyed. What experience teaches us is, that the exercise of the mental powers depends on the brain and the nerves; not that the mind is the brain and the nerves. We are sure the mind cannot be the brain, because the brain is an assemblage of beings; whereas the mind is one being. But the question has been brought to a de-

cision of another kind. In the 4th volume of the Memoirs of the Literary and Philosophical Society of Manchester, the reader will find a very valuable paper by Dr. Farrier, proving, by evidence apparently complete, that every part of the brain has been injured without affecting the act of thought. An abridgment of that memoir would weaken its reasoning; which, built on matters of fact and experience, appears to us to have shaken the modern theory of the materialists from its very foundation.

Dr. Priestley conceives, that the three doctrines of materialism, of that which is commonly called Socinianism, and of philosophical necessity, are equally parts of one system, being equally founded on just observations of nature, and fair deductions from the Scriptures; and that whosoever shall duly consider their connection and dependence on one another, will find no sufficient consistency in any general scheme of principles that does not comprehend them all. But it has been urged by another able writer, that, if man be the matter itself which constitutes the man, and not its form or arrangement, as Dr. Priestley allows, the man will always remain while the matter which constitutes him remains, however different its organization or arrangement may be; that since death does not destroy the matter which constitutes man, it does not destroy the man; and that, consequently, he goes on to exist after death, or is naturally immortal: that, in order to the resurrection of the same man, the same matter must arise: and that it is no less possible for man to have existed before his birth, than it is that he should exist after his death; and that, consequently, all the support to the Socinian scheme, which Dr. Priestley derives from his sentiments of materialism, falls to the ground. See farther the articles NECESSITY, MATERIALISM, and SOCINIANS.

SOU'LED. *a.* (from *soul.*) Furnished with mind (*Dryden*).

SOU'LLESS. *a.* (from *soul.*) Mean; low; spiritless (*Shakspeare*).

SOU'LSHOT. *s.* (*soul* and *shot.*) Something paid for a soul's requiem among the Romanists (*Ayliffe*).

SOUND. *a.* (ſunꝺ, Saxon.) 1. Healthy; hearty; not morbid; not diseased; not hurt (*Dryden*). 2. Right; not erroneous; orthodox (*Hooker*). 3. Stout; strong; lusty (*Abbot*). 4. Valid; not failing (*Spenser*). 5. Fast; hearty (*Milton*).

SOUND. *s.* (*sonde*, French.) A probe, an instrument used by chirurgeons to feel what is out of the reach of the fingers (*Sharp*).

To SOUND. *v. a.* 1. To search with a plummet; to try depth (*Hooker*). 2. To try; to examine (*Addison*).

To SOUND. *v. n.* To try with the sounding line (*Locke*).

SOUND. *s.* (*sepia.*) The cuttle-fish (*Ainsw.*).

SOUND. *s.* (*sonus*, Latin.) 1. Any thing audible; a noise; that which is perceived by the ear (*Bacon*). 2. Mere empty noise opposed to meaning (*Locke*).

SOUND, in geography, denotes a strait or inlet of the sea, between two capes or headlands.

The Sound is used, by way of eminence, for that celebrated strait which connects the German Sea to the Baltic. It is situated between the island of Zealand and the coast of Schonen. It is about 16 leagues in length, and in general about 5 in breadth, except near the castle of Cronenberg, where it is but one; so that there is no passage for vessels but under the cannon of the fortress.

SOUND considered philosophically. The vibrations of sonorous bodies are communicated to the air, and by the impressions thus made on the ear, excite the sensation of sound.

It is not every kind of vibratory motion produced in the air that is the cause of sound: a musical string may vibrate, but if it is touched by a bit of cloth, or any soft body, no sound is heard. The vibrations in the air that produce sound must be communicated by some elastic substance.

Sound is produced by the explosion of gunpowder, that is, by the sudden extrication of a fluid mass, dense, and highly elastic. It is produced also by the sudden rushing in of air to supply a vacuum: of which the crack of a whip appears to be an example.

To illustrate the cause of sound, it is to be observed, 1st, That a motion is necessary in the sonorous body for the production of sound. 2dly, That this motion exists first in the small and insensible parts of the sonorous bodies, and is excited in them by the mutual collision against each other, which produces the tremulous motion so observable in bodies that have a clear sound, as bells, musical chords, &c. 3dly, That this motion is communicated to, or produces a like motion in the air, or such parts of it as are fit to receive and propagate it. Lastly, That this motion must be communicated to those parts that are the proper and immediate instruments of hearing.

Now that motion of a sonorous body, which is the immediate cause of sound, may be owing to two different causes; either the percussion between it and other hard bodies, as in drums, bells, chords, &c.; or the beating and dashing of the sonorous body and the air immediately against each other, as in flutes, trumpets, &c.

But in both these cases, the motion, which is the consequence of the mutual action, as well as the immediate cause of the sonorous motion which the air conveys to the ear, is supposed to be an invisible, tremulous or undulating motion, in the small and insensible parts of the body. Perrault adds, that the visible motion of the grosser parts contributes no otherwise to sound, than as it causes the invisible motion of the smaller parts, which he calls particles, to distinguish them from the sensible ones, which he calls parts, and from the smallest of all, which are called corpuscles.

The sonorous body having made its impression on the contiguous air, that impression is propagated from one particle to another, according to the laws of pneumatics.

A few particles, for instance, driven from the surface of the body, push or press their adjacent particles into a less spase; and the medium, as it is thus rarefied in one place, becomes condensed in the other; but the air thus compressed in the second place is, by its elasticity, returned back again, both to its former place and its former state; and the air contiguous to that is compressed; and the like obtains when the air less compressed, expanding itself, a new compression is generated. Therefore from each agitation of the air there arises a motion in it, analogous to the motion of a wave on the surface of the water; which is called a wave or undulation of air.

In each wave, the particles go and return back again, through very short equal spaces; the motion of each particle being analogous to the motion of a vibrating pendulum while it performs two oscillations; and most of the laws of the pendulum, with very little alteration, being applicable to the former.

Sounds are as various as are the means that concur in producing them. The chief varieties result from the figure, constitution, quantity, &c., of the sonorous body; the manner of percussion, with the velocity, &c. of the consequent vibration; the state and constitution of the medium; the disposition, distance, &c. of the organ; the obstacles between the organ and the sonorous object and the adjacent bodies. The most notable distinction of sounds, arising from the various degrees and combinations of the conditions above mentioned, are into loud and low (or strong and weak); into grave and acute (or sharp and flat, or high and low); and into long and short. The management of which is the office of music.

Euler is of opinion, that no sound making fewer vibrations than 30 in a second, or more than 7520, is distinguishable by the human ear. According to this doctrine, the limit of our hearing, as to acute and grave, is an interval of 8 octaves. Tentam. Nov. Theor. Mus. cap. 1. sect. 13.

The velocity of sound is the same with that of the aerial waves, and does not vary much, whether it go with the wind or against it. By the wind indeed a certain quantity of air is carried from one place to another; and the sound is accelerated while its waves move through that part of the air, if their direction be the same as that of the wind. But as sound moves vastly swifter than the wind, the acceleration it will hereby receive is but inconsiderable; and the chief effect we can perceive from the wind is, that it increases and diminishes the space of the waves, so that by the help of it the sound may be heard to a greater distance than otherwise it would.

That the air is the usual medium of sound, appears from various experiments in rarefied and condensed air. In an unexhausted receiver, a small bell may be heard to some distance; but when exhausted, it can scarce be heard at the smallest distance. When the air is condensed, the sound is louder in proportion to the condensation, or quantity of air crowded in; of which there are many instances in Hauksbee's experiments, in Dr. Priestley's, and others.

Besides, sounding bodies communicate tremors to distant bodies; for example, the vibrating motion of a musical string puts others in motion, whose tension and quantity of matter dispose their vibrations to keep time with the pulses of air, propagated from the string that was struck. Galileo explains this phenomenon by observing, that a heavy pendulum may be put in motion by the least breath of the mouth, provided the blasts be often repeated, and keep time exactly with the vibrations of the pendulum; and also by the like art in raising a large bell.

It is not air alone that is capable of the impressions of sound, but water also; as is manifest by striking a bell under water, the sound of which may plainly enough be heard, only not so loud, and also a fourth deeper, according to good judges in musical notes. And Mersenne says, a sound made under water is of the same tone or note, as if made in air, and heard under the water.

The velocity of sound, or the space through which it is propagated in a given time, has been very differently estimated by authors who have written concerning this subject. Roberval states it at the rate of 560 feet in a second; Gassendus at 1473; Mersenne at 1474; Duhamel, in the History of the Academy of Sciences at Paris, at 1338; Newton at 968; Derham, in whose measure Flamsteed and Halley acquiesce, at 1142.

The reason of this variety is ascribed by Derham, partly to some of those gentlemen using strings and plummets instead of regular pendulums; and partly to the too small distance between the sonorous body and the place of observation; and partly to no regard being had to the winds.

But by the accounts since published by M. Cassini de Thury, in the Memoirs of the Royal Academy of Sciences at Paris, 1738, where cannon were fired at various as well as great distances, under many varieties of weather, wind, and other circumstances, and where the measures of the different places had been settled with the utmost exactness, it was found that sound was propagated, on a medium, at the rate of 1038 French feet in a second of time. But the French foot is in proportion to the English as 15 to 16; and consequently 1038 French feet are equal to 1107 English feet. Therefore the difference of the measures of Derham and Cassini is 35 English feet, or 33 French feet, in a second. The medium velocity of sound therefore is nearly at the rate of a mile, or 5280 feet, in 4¾ seconds, or a league in 14 seconds, or 13 miles in a minute. But sea miles are to land nearly as 7 to 6; and

therefore sound moves over a sea mile in $5\frac{1}{7}$ seconds nearly, or a sea league in 16 seconds.

Farther, it is a common observation, that persons in good health have about 75 pulsations, or beats of the artery at the wrist, in a minute; consequently in 75 pulsations, sound flies about 13 land miles, or $11\frac{1}{7}$ sea miles, which is about 1 land mile in 6 pulses, or one sea mile in 7 pulses, or a league in 20 pulses.

And hence the distance of objects may be found, by knowing the time employed by sound in moving from those objects to an observer. For example, on seeing the flash of a gun at sea, if 54 beats of the pulse at the wrist were counted before the report was heard; the distance of the gun will easily be found by dividing 54 by 20, which gives 2·7 leagues, or about 8 miles.

Newton defined the velocity of the vibrations of an elastic fluid, by comparing them with the vibrations of a pendulum, Princip. Math. lib. ii. props. 47, 49. His propositions are, that "the velocity with which vibrations are propagated through the air is the same that a heavy body would acquire by falling through half the height of the homogeneous atmosphere, or that height to which the atmosphere would be reduced, if it were every where of the same density and the same temperature with the air at the surface of the earth." And that "the velocity of the pulses propagated in an elastic fluid, are as the square root of the elasticity divided by the density of the fluid."

Newton's reasoning in the first of these propositions has been questioned by Euler, Cramer, and Lagrange: and it is well known that the velocity of sound computed as in the last, comes out less than by actual experiment. Laplace has suggested a very probable explanation of this, viz. that the condensation of the *undulæ* which must take place in the vibrations, produces a degree of sensible heat, by which the density is diminished while the elasticity remains the same. The heat required for that effect has been shown by Biot to be within the probable limits which analogy, in the absence of direct experiments, would lead us to assign. See Gregory's translation of Haüy's Philosophy, vol. i. And for accounts of the operations of different gasses upon sounds, as observed by Chladni, Jacquin, Priestley, Peralle, &c. see the translator's note at that place.

Upon the nature, production, and propagation of sound, see the articles ACOUSTICS and ECHO; also the Memoirs of the Academy and the Philos. Trans. in many places; Newton, Principia; Kircher, Mesurgia Universalis; Mersenne; Borelli, Del Suono; Priestley, Exper. and Observ. vol. 5; Hales, Sonorum Doctrina rationalis et experimentalis, 4to. 1778; Dr. T. Young's Natural Philosophy, vol. ii. See also an ingenious treatise published 1790, by Mr. G. Saunders, on Theatres; in which he relates many experiments made by himself, on the nature and propagation of sound. In this work, he shews the great effect of water, and some other bodies, in conducting of sound, probably by rendering the air more dense near them. Some of his conclusions and observations are as follow:

Earth may be supposed to have a twofold property with respect to sound. Being very porous, it absorbs sound, which is counteracted by its property of conducting sound, and occasions it to pass on a plane, in an equal proportion to its progress in air, unencumbered by any body.

If a sound be sufficiently intense to impress the earth in its tremulous quality, it will be carried to a considerable distance, as when the earth is struck with any thing hard, as by the motion of a carriage, horses feet, &c.

Plaster is proportionally better than loose earth for conducting sound, as it is more compact.

Clothes of every kind, particularly woollen cloths, are very prejudicial to sound: their absorption of sound may be compared to that of water, which they greedily imbibe.

A number of people seated before others, as in the pit or gallery of a theatre, do considerably prevent the voice reaching those behind; and hence it is, that we hear so much better in the front of the galleries, or of any situation, than behind others, though we may be nearer to the speaker. Our seats, rising so little above each other, occasion this defect, which would be remedied, could we have the seats to rise their whole height above each other, as in the ancient theatres.

Paint has generally been thought unfavourable to sound, from its being so to musical instruments, whose effects it quite destroys.

Musical instruments mostly depend on the vibrative or tremulous property of the material, which a body of colour hardened in oil must very much alter; but we should distinguish that this regards the formation of sound, which may not altogether be the case in the progress of it.

Water has been little noticed, with respect to its conducting sound; but it will be found to be of the greatest consequence. I had often perceived in newly-finished houses, that while they were yet damp, they produced echoes; but that the echoing abated as they dried.

Exp. When I made the following experiment there was a gentle wind; consequently the water was proportionally agitated. I chose a quiet part of the river Thames, near Chelsea Hospital, and with two boats tried the distance the voice would reach. On the water we could distinctly hear a person read at the distance of 140 feet, on land at that of 76. It should be observed, that on land no noise intervened; but on the river some noise was occasioned by the flowing of the water against the boats: so that the difference on land and on water must be much more.

Watermen observe, that when the water is still, and the weather quite calm, if no noise intervene, a whisper may be heard across the river; and that with the current it will be

carried to a much greater distance, and vice versa against the current.

Mariners well know the difference of sound on sea and land.

When a canal of water was laid under the pit floor of the theatre of Argentino, at Rome, a surprising difference was observed; the voice has since been heard at the end very distinctly, where it was before scarce distinguishable. It is observable that, in this part, the canal is covered with a brick arch, over which there is a quantity of earth, and the timber floor over all.

The villa Simonetta near Milan, so remarkable for its echoes, is entirely over arcades of water.

Another villa near Rouen, remarkable for its echo, is built over subterraneous cavities of water.

A reservoir of water domed over, near Stanmore, has a strong echo.

I do not remember ever being under the arches of a stone bridge that did not echo; which is not always the case with similar structures on land.

A house in Lambeth Marsh, inhabited by Mr. Turtle, is very damp during winter, when it yields an echo which abates as the house becomes dry in summer.

Kircher observes, that echoes repeat more by night than during the day, he makes the difference to be double.

Dr. Plott says, the echo in Woodstock park repeated 17 times by day, and 20 by night. And Addison's experiment at the villa Simonetta was in a fog, when it produced 56 repetitions.

After all these instances, I think little doubt can remain of the influence water has on sound; and I conclude that it conducts sound more than any other body whatever.

After water, stone may be reckoned the best conductor of sound. To what cause it may be attributed, I leave to future enquiries: I have confined myself to speak of facts only as they appear.

Stone is sonorous, but gives a harsh disagreeable tone, unfavourable to music.

Brick, in respect to sound, has nearly the same properties as stone. Part of the garden wall of the late W. Pitt, Esq. of Kingston in Dorsetshire, conveys a whisper to the distance of near 200 feet.

Wood is sonorous, conductive, and vibrative; of all materials it produces a tone the most agreeable and melodious; and it is therefore the fittest for musical instruments, and for lining of rooms and theatres.

The common notion that whispering at one end of a long piece of timber would be heard at the other end, I found by experiment to be erroneous. A stick of timber 65 feet long being slightly struck at one end, a sound was heard at the other, and the tremor very perceptible: which is easily accounted for, when we consider the number or length of the fibres that compose it, each of which may be compared to a string of catgut.

SOUND, in music, denotes a quality in the several agitations of the air, so as to make music or harmony.

Sound is the object of music; which is nothing but the art of applying sounds, under such circumstances of tone and time, as to raise agreeable sensations. The principal affection of sound, by which it becomes fitted to have this end, is that by which it is distinguished into acute and grave. This difference depends on the nature of the sonorous body; the particular figure and quantity of it; and even in some cases, on the part of the body where it is struck: and it is this that constitutes what are called different tones.

The cause of this difference appears to be no other than the different velocities of the vibrations of the sounding body. Indeed the tone of a sound is found, by numerous experiments, to depend on the nature of those vibrations, whose differences we can conceive no otherwise than as having different velocities: and since it is proved that the small vibrations of the same chord are all performed in equal times, and that the tone of a sound, which continues for some time after the stroke, is the same from first to last, it follows, that the tone is necessarily connected with a certain quantity of time in making each vibration, or each wave; or that a certain number of vibrations, made in a given time, constitute a determinate tone. Thus whatever vibrates 256 times in a second, gives the note C of the tenor cliff.

If the vibrations be isochronous, or performed in the same time, the sound is called musical, and is said to continue at the same pitch; and it is also accounted acuter, sharper, or higher than any other sound, whose vibrations are slower, and therefore graver, flatter, or lower, than any other whose vibrations are quicker. See UNISON.

From the same principle arise what are called concords, &c.; which result from the frequent unisons and coincidences of the vibrations of two sonorous bodies, and consequently of the pulses or the waves of the air occasioned by them.

On the contrary, the result of less frequent coincidences of those vibrations is what is called discord.

Another considerable distinction of musical sounds, is that by which they are called long and short, owing to the continuation of the impulse of the efficient cause on the sonorous body for a longer or shorter time, as in the notes of a violin, &c. which are made longer or shorter by strokes of different length or quickness. This continuity is properly a succession of several sounds, or the effect of several distinct strokes, or repeated impulses, on the sonorous body, so quick, that we judge it one continued sound, especially where it is continued in the same degree of strength; and hence arises the doctrine of measure and time.

Musical sounds are also divided into simple and compound; and that in two different ways. In the first, a sound is said to be com-

pound, when a number of successive vibrations of the sonorous body, and the air, come so fast upon the ear, that we judge them the same continued sound; like as in the phenomenon of the circle of fire, caused by putting the fired end of a stick in a quick circular motion; where supposing the end of the stick in any point of the circle, the idea we receive of it there continues till the impression is renewed by a sudden return.

A simple sound then, with regard to this composition, should be the effect of a single vibration, or of as many vibrations as are necessary to raise in us the idea of sound.

In the second sense of composition, a simple sound is the product of one voice, or one instrument, &c.

A compound sound consists of the sounds of several distinct voices or instruments all united in the same individual time, and measure of duration, that is, all striking the ear together, whatever their other differences may be. But in this sense again, there is a twofold composition; a natural and an artificial one.

The natural composition is that proceeding from the manifold reflections of the first sound from adjacent bodies, where the reflections are not so sudden as to occasion echoes, but are all in the same tune with the first note.

The artificial composition, which alone comes under the musician's province, is that mixture of several sounds, which being made by art, the ingredient sounds are separable, and distinguishable from one another. In this sense the distinct sounds of several voices or instruments, or several notes of the same instrument, are called simple sounds, in contradistinction to the compound ones, in which, to answer the end of music, the simple must have met an agreement in all relations, chiefly as to acuteness and gravity, that the ear may receive the mixture with pleasure. See CONCORD.

SOUND BOARD, in an organ, is a reservoir into which the wind, drawn in by the bellows, is conducted by a port-vent, and hence distributed into the pipes placed over holes in its upper part: this wind enters them by valves, which open by pressing upon the stops or keys; after drawing the registers, which prevent the air from entering any of the pipes, except those it is required in. See ORGAN.

To SOUND. *v. n.* 1. To make a noise; to emit a noise (*Milton*). 2. To exhibit by sound, or likeness of sound (*Shakspeare*). 3. To be conveyed in sound (1 *Thess.*).

To SOUND. *v. a.* 1. To cause to make a noise; to play on (*Spenser*). 2. To betoken or direct by a sound (*Waller*). 3. To celebrate by sound (*Milton*).

SOU'NDING. *a.* (from *sound.*) Sonorous; having a magnificent sound (*Dryden*).

SOUNDING, the operation of trying the depth of the water, and the quality of the ground, by means of a plummet sunk from a ship to the bottom. For sounding there are two plummets used, one of which is called the hand lead, weighing about eight or nine pounds; and the other, the deep-sea lead, weighing from twenty-five to thirty pounds, and both are shaped like the frustrum of a cone or a pyramid. The former is used in shallow waters, and the latter at a great distance from the shore, particularly on approaching the land after a sea voyage. Accordingly, the lines employed for this purpose are called the deep-sea-lead, and the hand-lead line. The hand-lead line, which is generally twenty fathoms in length, is marked at every two or three fathoms, so that the depth of water may be ascertained either in the day or night. At the depth of two and three fathoms, there are marks of black leather; at five fathoms, there is a white rag; at seven, a red rag; at ten, black leather; at thirteen, black leather; at fifteen, a white rag; and at seventeen, a red rag.

Sounding with the hand-lead, which is called heaving the lead by seamen, is generally performed by a man who stands in the main-chains to windward. Having the line all ready to run out without interruption, he holds it nearly at the distance of a fathom from the plummet, and having swung the latter backwards and forwards three or four times, in order to acquire the greater velocity, he swings it round his head, and thence as far forward as is necessary; so that, by the lead's sinking while the ship advances, the line may be almost perpendicular when it reaches the bottom. The person sounding then proclaims the depth of the water in a kind of song, resembling the cries of London hawkers. Thus, if the mark of five fathoms is close to the surface of the water, he calls, "by the mark five," and as there is no mark at four, six, eight, &c. he estimates those numbers, and calls, "by the dip four." If he judges it to be a quarter or an half more than any particular number, he calls, "and a quarter five—and a half four," &c. If he conceives the depth to be three quarters more than a particular number, he calls it a quarter less than the next: thus, at four fathoms and three quarters, he calls, "a quarter less five," &c.

The deep-sea-lead is marked with two knots at twenty fathoms, three at forty, four at fifty, and so on to the end. It is also marked with a single knot in the middle of each interval, as at twenty-five, thirty-five, forty-five fathoms, &c. To use this lead more effectually at sea, or in deep water on the sea coast, it is usual previously to bring-to the ship, in order to retard her course; the lead is then thrown as far as possible from the ship, on the line of her drift, so that as it sinks, the ship drives more perpendicularly over it. The pilot, feeling the lead strike the bottom readily, discovers the depth of the water by the mark on the line nearest its surface.

A very ingenious machine for taking soundings has been invented by Mr. Edward Massey, of Newcastle in Staffordshire. It has stood the test of several severe trials, and therefore deserves recommendation. A description of the apparatus is given by Robert Clifford,

Esq. in No. 172, of Tilloch's Philosophical Magazine.

SO'UNDLY. *ad.* (from *sound.*) 1. Healthily; heartily. 2. Lustily; stoutly; strongly (*Swift*). 3. Truly; rightly (*Bacon*). 4. Fast; closely (*Locke*).

SO'UNDNESS. *s.* (from *sound.*) 1. Health; heartiness (*Shakspeare*). 2. Truth; rectitude; incorrupt state (*Law*). 3. Strength; solidity.

So'UNDNESS, is also a term much employed in horse-dealing, and of extensive meaning and importance both to dealers and purchasers, though its sense has never perhaps been precisely defined. The general custom between buyer and seller is as follows: the horse is sold with or without certain conditions in respect to what is implied by soundness; and this is done by what is called a warranty on the part of the seller; who hereby assures him to be perfectly free from vice or blemish, and quiet to ride, or draw, for which purpose soever he may happen to be purchased. A horse sold without a warranty on the contrary, and taken as he is, is purchased with all faults, and cannot be returned under any plea whatever, unless he can be proved to have been glandered at the time of purchase, in which state no horse can be legally sold, or of legal value.

In the strict and equitable sense of the word, a horse perfectly sound should have no drawback whatever, no obstruction in sight, no impediment to action; he should be neither lame, blind, broken-winded, or diseased, or impotent in any other way. He should not only be free from impediment at the time of sale, but *bona fide* never known to have been otherwise. There are some horse-dealers, however, and of fair character too, who support a different opinion, and conceive that a horse may be sold warranted perfectly sound, after he has recovered from a palpable lameness: not recollecting that such horse is often liable to a relapse, or repetition of the injury; or that in every contested case a verdict has been pronounced against the seller whenever sufficient evidence has proved such horse to have been lame at any time previous to the purchase.

SOUP, a strong decoction of beef, veal, or other animal substances; and which is generally seasoned with aromatic vegetables, pepper, or similar heating spices.

Soups form a principal article at the tables of the luxurious; being generally served as a first course; though sometimes they constitute the whole dinner of those who are less opulent, under the mistaken notion, that such liquid is more wholesome, and easy of digestion, than solid meat. See BROTH. Such dishes ought, however, to be given with great caution to convalescents; as the large proportion of spices, wines, and other stimulating articles that enter into the composition of soups, cannot fail to oppress the stomach, to irritate the system, and not unfrequently to occasion a relapse.

Portable or dry soup is a kind of cake formed by boiling the gelatinous parts of animal substances till the watery parts are evaporated. This species of soup is chiefly used at sea, and has been found of great advantage. The following receipt will show how it is prepared. Of calves feet take 4; leg of beef 12lbs.; knuckle of veal 3lbs.; and leg of mutton 10lbs. These are to be boiled in a sufficient quantity of water, and the scum taken off as usual; after which the soup is to be separated from the meat by straining and pressure. The meat is then to be boiled a second time in other water; and the two decoctions, being added together, must be left to cool, in order that the fat may be exactly separated. The soup must then be clarified with five or six whites of eggs, and a sufficient quantity of common salt added. The liquor is then strained through flannel, and evaporated on the water-bath to the consistence of a very thick paste; after which it is spread rather thin upon a smooth stone, then cut into cakes, and lastly dried in a stove until it becomes brittle: these cakes are kept in well closed bottles. The same process may be used to make a portable soup of the flesh of poultry; and aromatic herbs may be used as a seasoning, if thought proper. These tablets or cakes may be kept four or five years. When intended to be used, the quantity of half an ounce is put into a large glass of boiling water, which is to be covered, and set upon hot ashes for a quarter of an hour, or until the whole is entirely dissolved. It forms an excellent soup, and requires no addition but a small quantity of salt.

SOUR, or SUR, a river of the Netherlands, which runs from W. to E. through Luxemburg, and falls into the Moselle, a little above Treves.

SOUR. *a.* (ruɲ, Sax. *sur*, Welsh.) 1. Acid; austere; pungent on the palate with astringency (*Dryden*). 2. Harsh of temper; crabbed; peevish; morose; severe (*Brown*). 3. Afflictive; painful (*Shakspeare*). 4. Expressing discontent (*Swift*).

SOUR. *s.* (from the adj.) Acid substance.

To SOUR. *v. a.* 1. To make acid (*Dryden*). 2. To make harsh, or unkindly (*Mortimer*). 3. To make uneasy; to make less pleasing (*Dryden*). 4. To make discontented (*Shaks.*).

To SOUR. *v. n.* 1. To become acid (*Arbuthnot*). 2. To grow peevish or crabbed (*Add.*).

SOUR GOURD, in botany. See ADANSONIA.

SOURCE. *s.* (*sourse*, Fr.) 1. Spring; fountain; head (*Addison*). 2. Original; first cause (*Milton*). 3. First producer (*Waller*).

SO'URISH. *a.* (from *sour.*) Somewhat sour.

SO'URLY. *ad.* (from *sour.*) 1. With acidity. 2. With acrimony (*Dryden*).

SO'URNESS. *s.* (from *sour.*) 1. Acidity; austereness of taste (*Denham*). 2. Asperity; harshness of temper (*Addison*).

SO'URSOP. *s.* Custard-apple (*Miller*). See ANNONA.

SOUS. *s.* (*sol*, Fr.) A small denomination of money. See SOL.

SOUSA, or SUSA, a strong town of the kingdom of Tunis, capital of a province of the same name, with a castle and a good harbour. It is a place of some trade, and seated on a high

rock, near the sea, 65 miles S.E. of Tunis. Lon. 11. 15 E. Lat. 35. 52 N.

SOUSE. *s.* (*sout*, salt, Dutch.) 1. Pickle made of salt. 2. Any thing kept parboiled in salt pickle (*Tusser*).

To SOUSE. *v. a.* (from the noun.) 1. To parboil, or steep in pickle (*Pope*). 2. To throw into the water (*Shakspeare*).

To SOUSE. *v. n.* (from *sous*, or *dessous*, down, French.) To fall as a bird on his prey.

To SOUSE. *v. a.* To strike with sudden violence, as a bird strikes his prey (*Shakspeare*).

SOUSE. *ad.* With sudden violence (*Young*).

SOU-TCHEOU-FOU, a city of China, the second in the province of Kiang-nan. It is so intersected by canals of fresh water, that Europeans compare it to Venice; and the country round it is so delightful, that the Chinese call this city the paradise of the world. The brocades and embroideries made here are esteemed throughout the whole empire. Its population is prodigious; but its jurisdiction extends over only one city of the second, and seven of the third class. Lon. 112. 20 E. Lat. 38. 40 N.

SO'UTERRAIN. *s.* (*souterrain*, Fr.) A grotto or cavern in the ground (*Arbuthnot*).

SOUTH. *s.* (ruð, Sax. *suyd*, Dutch.) 1. The direction the sun has with respect to us at noon; opposed to north (*Bacon*). 2. The southern regions of the globe (*Milton*). 3. The wind that blows from the south (*Shaks.*).

SOUTH. *a.* (from the noun.) Southern; meridional (*Job*).

SOUTH. *ad.* 1. Toward the south (*Shakspeare*). 2. From the south (*Bacon*).

SOUTH (Dr. Robert), an eminent theological writer, was the son of Mr. William South, a merchant of London, and was born at Hackney near that city in 1633. He studied at Westminster school, and afterwards in Christ church college, Oxford. In 1654, he wrote a copy of Latin verses to congratulate Cromwell upon the peace concluded with the Dutch; and the next year a Latin poem, intitled Musica Incantans. In 1660 he was elected public orator of the university; and the next year became domestic chaplain to Edward earl of Clarendon, lord high chancellor of England. In 1663 he was installed prebendary of Westminster, admitted to the degree of doctor of divinity, and had a sinecure bestowed on him in Wales by his patron the earl of Clarendon; after whose retirement into France in 1667 he became chaplain to the duke of York. In 1670 he was installed canon of Christ church in Oxford: and in 1676 attended as chaplain to Laurence Hyde, esq. ambassador extraordinary to the king of Poland. In 1678 he was presented to the rectory of Islip in Oxfordshire; and in 1680 rebuilt the chancel of that church, as he afterwards did the rectory house belonging to it. After the revolution he took the oath of allegiance to king William and queen Mary, though he excused himself from accepting a great dignity in the church, vacated by the personal refusal of that oath. His health began to decline several years before his death, which happened in 1716. He was interred in Westminster Abbey, where a monument is erected to his memory. He published, 1. Animadversions on Dr. Sherlock's Vindication of the Holy and ever blessed Trinity. 2. A Defence of his Animadversions. 3. Sermons, 8 vols. 8vo. And after his decease were published his Opera Posthuma Latina, and his posthumous English works. Dr. South was remarkable for his wit, which abounds in all his writings, and particularly in his sermons: but at the same time they equally abound in ill-humour, spleen, and satire. He was remarkable for being a time-server. During the life of Cromwell he was a staunch presbyterian, and then railed against the independents; at the restoration he exerted his pulpit eloquence against the presbyterians; and in the reign of queen Anne, was a warm advocate for Sacheverel.

SOUTH SEA. See PACIFIC OCEAN.

SOUTHAM, a town in Warwickshire, with a market on Monday; and noted for its cider. It is 13 miles S. of Coventry, and 83 N.W. of London. Lon. 1. 23 W. Lat. 52. 36 N.

SOUTHAMPTON, a seaport and borough in Hampshire, with a market on Tuesday, Thursday, and Saturday. It is situate between the Itchen and Test, which here flow into an inlet of the sea, called Trissanton Bay, or Southampton Water. The inlet is navigable almost to the head for vessels of considerable burden; and the two rivers admit small craft some way up the country. It was formerly a port of great commerce, still possesses a trade in French and port wines, and has a particular connection with Guernsey and Jersey. It contains five churches; is surrounded by walls and several watch-towers; and had a strong castle, now in ruins. It is a county of itself, governed by a mayor, and sends two members to parliament. It is a fashionable place of resort for sea-bathing; and it was on this beach that the Danish king Canute gave that striking reproof to his flattering courtiers, when the disobedient tide washed his feet. Two miles from this town is Woodmills, where is a very curious manufacture of ship-blocks, from which all the king's yards are supplied. Southampton is 12 miles S. by W. of Winchester, and 75 W.S.W. of London. Lon. 1. 26 W. Lat. 50. 55 N.

SOUTHEA'ST, the point of the compass which is midway between the east and south.

SOUTHEND (New), a village in Essex, seated at the mouth of the Thames, 44 miles E. of London. Being the nearest place to the metropolis for sea-bathing, it is much resorted to, and has handsome accommodations for the company.

SO'UTHERLY. *a.* (from *south.*) 1. Belonging to any of the points denominated from the south; not absolutely southern. 2. Lying toward the south (*Graunt*). 3. Coming from about the south (*Shakspeare*).

SO'UTHERN. *a.* (ruðerne, Saxon; from *south.*) 1. Belonging to the south; meridional (*Dryden*). 2. Lying towards the south (*Shakspeare*). 3. Coming from the south (*Bacon*).

SOUTHERN (Thomas), a dramatic writer, was born in Ireland about 1662, and educated at the university of Dublin, from whence he removed to Oxford. In 1682 he produced the Persian Prince, or Loyal Brother, which was intended to compliment James duke of York, who afterwards rewarded him with a captain's commission in the army. His tragedy of The Fatal Marriage, or, The Innocent Adultery, now performed under the title of Isabella, has been esteemed by some the most affecting of any in our language: but the most finished of all his plays is his Oroonoko, or The Royal Slave, built upon a true story related by Mrs. Behn in one of her novels. He died in 1746.

SOUTHERNWOOD. See ARTEMISIA.

SO'UTHING. *a.* (from *south.*) Going toward the south (*Dryden*).

So'UTHING. *s.* Tendency to the south

SO'UTHMOST. *a.* (from *south.*) Furthest toward the south (*Milton*).

SO'UTHSAY. *s.* (properly *soothsay.*) Prediction (*Spenser*).

To So'UTHSAY. *v. n.* (See SOOTHSAY.) To predict (*Camden*).

SOUTHSEA TEA. See ILEX.

SO'UTHWARD. *ad.* (from *south.*) Toward the south (*Thomson*).

So'UTHWARD. *s.* The southern regions.

SOUTHWARK, a borough in Surry, which may be considered as part of the metropolis, being seated on the opposite side of the Thames, and under the jurisdiction of the corporation of London, who have an officer here called the bailiff of Southwark. It is called the Borough, by way of distinction, and is a populous place, participating considerably in the commerce of London. It sends two members to parliament. It contains six churches, a Roman catholic chapel, many places of worship for dissenters, and several charitable foundations, particularly, St. Thomas's Hospital, Guy's Hospital, and the Magdalen Hospital; also the King's Bench and Marshalsea prisons, and a county gaol. See LONDON.

SOUTHWELL, a town in Nottinghamshire, with a market on Saturday. It is an ancient place, and has a collegiate church. It is 10 miles N.E. of Nottingham, and 139 N.N.W. of London. Lon. 0. 51 W. Lat. 53. 6 N.

SOUTHWE'ST. *s.* (*south* and *west.*) Point between the south and west (*Bacon*).

SOUTHWOLD, a corporate town and seaport in Suffolk, with a market on Thursday. It is seated on a cliff, near a fine bay, with a harbour to the S. and the river Blythe and a drawbridge on the W.; that it is almost surrounded with water, especially at every high tide. Here a much esteemed salt is made, and it has also a trade in corn, beer, and herrings. It is commonly called Sowle or Sole, and its bay is named Solebay. In this bay was the great seafight between the Dutch admiral De Ruyter, and James duke of York, in which the victory was undecided. Southwold is 20 miles S. of Yarmouth, and 104 S.E. of London. Lon. 1. 54 W. Lat. 52. 24 N.

SOW, the female of swine. See SUS.

SOW BREAD, in botany. See CYCLAMEN.

SOW THISTLE. See SONCHUS.

To SOW. *v. n.* (ꝑapan, Sax. *sayen*, Dutch.) To scatter seed in order to a harvest (*Psalms*).

To SOW. *v. a.* part. pass. *sown.* 1. To scatter in the ground in order to growth; to propagate by seed (*Bacon*). 2. To spread; to propagate (*Milton*). 3. To impregnate or stock with seed (*Isaiah*). 4. To besprinkle (*Milton*).

To SOW. *v. a.* (for *sew.*) To join by needlework (*Milton*).

To SOWCE. *v. a.* To throw into the water. See SOUSE (*L'Estrange*).

SO'WER. *s.* (from *sow.*) 1. He that sprinkles the seed (*Matthew*). 2. A scatterer (*Hakewill*). 3. A breeder; a promoter (*Bacon*).

SOWERBÆA, in botany, a genus of the class hexandria, order monogynia. Corol inferior, six-petalled; filaments three, with two anthers upon each, and three short barren ones between. One species only, a native of New South Wales.

SO'WINS. *s.* Flummery, made of oatmeal somewhat soured (*Swift*).

To SOWL. *v. a.* To pull by the ears (*Shaks.*).

SOWN. The participle of *sow.*

SOY, or SOOJU, a species of liquid condiment, which is imported from India, and is used as a sauce for fish. It is prepared from the leguminous fruit of the soja (*dolichos soja*, Linnæus) a native of Japan.

The pods are first boiled, till they become soft; when equal parts of them, and of muggi (wheat or barley that has been coarsely ground), are thoroughly mixed. This preparation is then kept in a close vessel, and a warm place, for twenty-four hours, in order to ferment; after which, the mass is put into a pot, and covered with a large portion of common salt, when two measures and a half of water are poured over the whole. The compound is stirred, once at the least, every day, for the space of two or three months; and, at the end of that period, it is filtered; the expressed liquor being preserved in wooden vessels. Fresh water is next added to the same mass; which, after stirring it occasionally for several days, is at length strained; and the liquor, though of an inferior kind, thus rendered fit for use.

Soy possesses a strong saline taste, but has only a slight aromatic flavour: it is chiefly used at the tables of the luxurious; and is one of those artificial stimulants of the palate, which deserves no commendation, especially for vitiated or relaxed habits.

END OF THE TENTH VOLUME.

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